



Aerospace Medicine
and Biology
A Continuing
Bibliography
with Indexes

NASA SP-7011(253)
January 1984



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Accession numbers cited in this Supplement fall within the following ranges.

STAR (N-10000 Series)	N83-34885 - N83-37053
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AEROSPACE MEDICINE AND BIOLOGY

A CONTINUING BIBLIOGRAPHY WITH INDEXES

(Supplement 253)

A selection of annotated references to unclassified reports and journal articles that were introduced into the NASA scientific and technical information system and announced in December 1983 in

- *Scientific and Technical Aerospace Reports (STAR)*
- *International Aerospace Abstracts (IAA).*



Scientific and Technical Information Branch

1984

National Aeronautics and Space Administration

Washington, DC

NASA SP-7011 and its supplements are available from the National Technical Information Service (NTIS). Questions on the availability of the predecessor publications, Aerospace Medicine and Biology (Volumes I - XI) should be directed to NTIS.

This supplement is available as NTISUB/123/093 from the National Technical Information Service (NTIS), Springfield, Virginia 22161 at the price of \$7.00 domestic; \$14.00 foreign.

INTRODUCTION

This Supplement to *Aerospace Medicine and Biology* lists 201 reports, articles and other documents announced during December 1983 in *Scientific and Technical Aerospace Reports (STAR)* or in *International Aerospace Abstracts (IAA)*. The first issue of the bibliography was published in July 1964.

In its subject coverage, *Aerospace Medicine and Biology* concentrates on the biological, physiological, psychological, and environmental effects to which man is subjected during and following simulated or actual flight in the Earth's atmosphere or in interplanetary space. References describing similar effects of biological organisms of lower order are also included. Such related topics as sanitary problems, pharmacology, toxicology, safety and survival, life support systems, exobiology, and personnel factors receive appropriate attention. In general, emphasis is placed on applied research, but references to fundamental studies and theoretical principles related to experimental development also qualify for inclusion.

Each entry in the bibliography consists of a bibliographic citation accompanied in most cases by an abstract. The listing of the entries is arranged by *STAR* categories 51 through 55, the Life Sciences division. The citations, and abstracts when available, are reproduced exactly as they appeared originally in *IAA* or *STAR*, including the original accession numbers from the respective announcement journals. The *IAA* items will precede the *STAR* items within each category.

Six indexes -- subject, personal author, corporate source, contract, report number, and accession number -- are included.

An annual index will be prepared at the end of the calendar year covering all documents listed in the 1983 Supplements.

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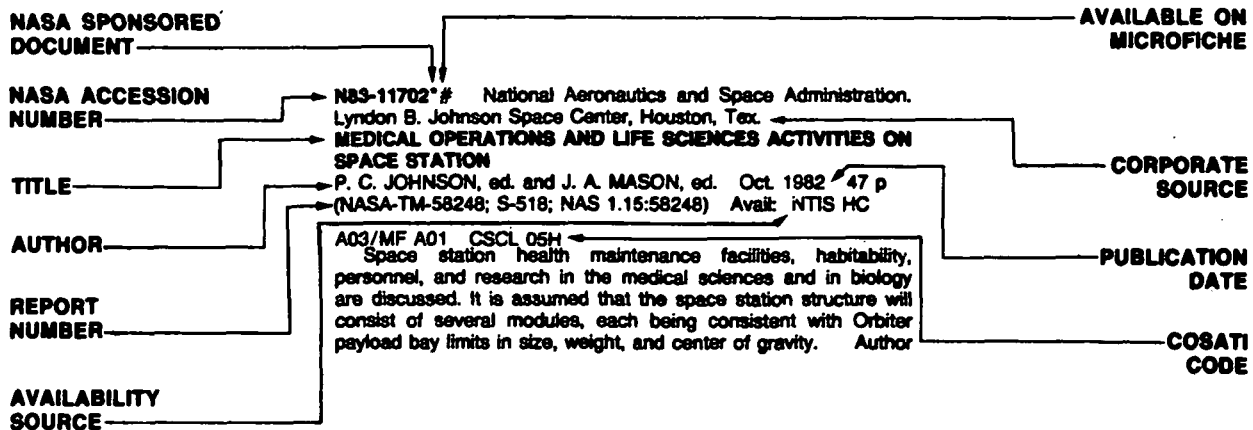
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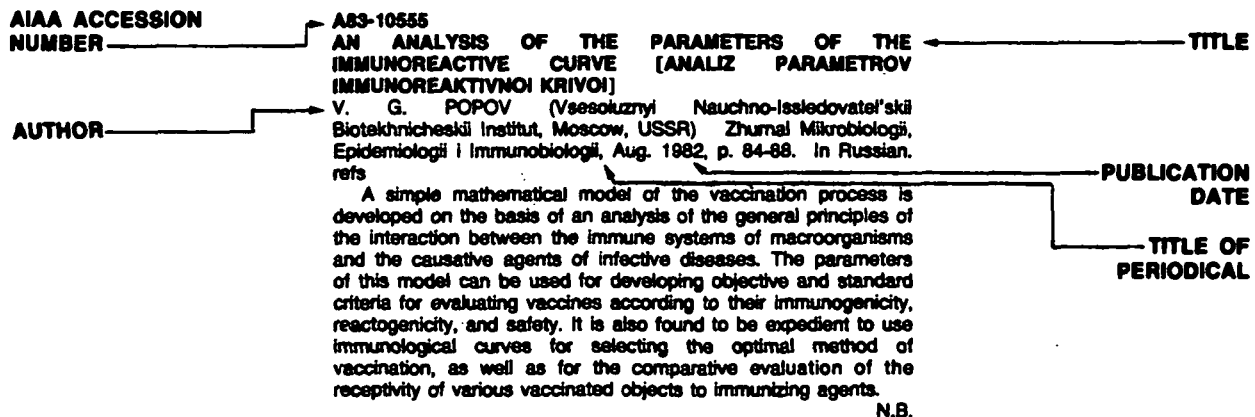
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AEROSPACE MEDICINE AND BIOLOGY

(A Continuing Bibliography (Suppl. 253))

JANUARY 1984

51

LIFE SCIENCES (GENERAL)

Includes genetics.

A83-47099

THE STRUCTURAL AND FUNCTIONAL BASES OF THE COMPENSATION OF FUNCTIONS IN THE CASE OF SPINAL CORD TRAUMA [STRUKTURNO-FUNKTSIONAL'NYE OSNOVY KOMPENSATSII FUNKTSII PRI TRAVME SPINNOGO MOZGA]
V. P. PODACHIN, G. G. MUSALOV, and N. I. NEZLINA Moscow, Izdatel'stvo Nauka, 1983, 192 p. In Russian. refs

Experimental data obtained during investigations of the functional and morphological consequences of partial and complete severing of the spinal cord at various locations in animals are examined. Results are presented of electrophysiological and histological investigations of the compensatory processes and their main features at various stages of the recovery of the disordered functions. The various paths and methods of the compensation of the disordered functions, and the specific importance of the physiological and morphological processes of the recovery of the functions following spinal cord trauma are studied. N.B.

A83-47148

RHYTHMIC ACTIVITY IN SENSORY SYSTEMS [RITMICHESKAIA AKTIVNOST' V SENSORYNYKH SISTEMAKH]
V. I. GUSELNIKOV and A. F. IZNAK Moscow, Izdatel'stvo Moskovskogo Universiteta, 1983, 216 p. In Russian. refs

The neurophysiological mechanisms of the basic rhythmic bioelectrical processes in the visual, somatic, auditory, and olfactory sensory systems of the brain are investigated. Topics examined include the spontaneous and evoked rhythms at various levels of the analyzers, the neuronal mechanisms of their generation, the models of the structure and functioning of the nerve network, and the generated rhythmic activity. Attention is focused on the comparative-physiological and functional aspects of rhythmic activity and the possible role of its mechanisms in the processing of sensory information. Other topics studied include the rhythmic activities of the retina and the visual cortex, the localization of the pacemaker of rhythmic activity, functional aspects of the alpha rhythm in humans, the mu rhythm of the EEG in humans, and the rhythmic oscillation in olfactory epithelium. N.B.

A83-47302#

SINGLE CELL ALGAE AND HIGHER PLANT CELL CULTURES USED IN SPACE BIOLOGY

P. G. SIDORENKO, A. F. POPOVA, D. A. KLIMCHUK, G. M. MARTIN, and G. F. IVANENKO (Ukrainian Academy of Sciences, Institute of Botany, Kiev, Ukrainian SSR) International Astronautical Federation, International Astronautical Congress, 34th, Budapest, Hungary, Oct. 10-15, 1983. 5 p. refs (IAF PAPER 83-185)

The results of experimentation with an autotrophic strain of *Chlorella* cells and the higher plant form *Haplopappus* on the Salyut-6 space station and Soyuz-22 flight are reported. The cells were studied in space conditions to determine any effects of spaceflight on their development, since algae and other plant

organisms are regarded as essential to food supplies and breathing air regeneration on long-term missions. The growth and structure-functional cell abilities of the green algae and the higher plant cell cultures were monitored for the influences of microgravity, acceleration, and vibration. No detectable aberrations were noted for the one-celled samples, particularly in the growth, taste, or shapes of the cells studied. M.S.K.

A83-47304#

SEROTONIN IN INDIVIDUAL HYPOTHALAMIC NUCLEI OF RATS AFTER SPACE FLIGHT ON BIOSATELLITE COSMOS 1129

J. CULMAN, R. KVETNANSKY, L. MACHO (Slovenska Akademia Vied, Ustav Experimentalnej Endokrinologie, Bratislava, Czechoslovakia), L. SEROVA, and R. A. TIGRANIAN (Ministerstvo Zdravookhraneniia SSSR, Institut Mediko-Biologicheskikh Problem, Moscow, USSR) International Astronautical Federation, International Astronautical Congress, 34th, Budapest, Hungary, Oct. 10-15, 1983. 7 p. refs (IAF PAPER 83-188)

The effects of stressful factors and weightlessness during long-term spaceflight on the serotonergic system in the hypothalamus were investigated in rats flown on the biosatellite COSMOS 1129. Previous studies have shown that the concentration of serotonin (5-HT) in the hypothalamus significantly increases in acutely stressed rats as well as in rats subjected to repeated immobilization stress. The concentration of 5-HT was found to be unchanged in the majority of the hypothalamic nuclei of animals subjected to weightlessness. An increase in 5-HT was observed in the supraoptic nucleus (NSO), while a decrease was found in the periventricular nucleus. The exposure of flight rats to repeated immobilization stress resulted in a significant increase of 5-HT in the NSO, and the paraventricular and dorsomedial nuclei. These findings indicate that long-term space flight and weightlessness are not stressogenic factors with respect to the serotonergic system in the hypothalamus of rats. N.B.

A83-47305#

THE EFFECT OF HYPOKINESIA ON LIPID METABOLISM IN ADIPOSE TISSUE

L. MACHO, R. KVETNANSKY, and M. FICKOVA (Slovenska Akademia Vied, Ustav Experimentalnej Endokrinologie, Bratislava, Czechoslovakia) International Astronautical Federation, International Astronautical Congress, 34th, Budapest, Hungary, Oct. 10-15, 1983. 6 p. refs (IAF PAPER 83-189)

The effect of various periods of hypokinesia on lipid metabolism was investigated in rat adipose tissue using immobilization as an analog of weightlessness. The content of nonesterified fatty acids (NEFA), epinephrine, and norepinephrine (NE) in the plasma was determined, and the release of NEFA and the incorporation of (C-14)-U-glucose into lipids was analyzed in slices of adipose tissue. It was found that the content of NEFA and NE returned to control values in the period of recovery 7 and 21 days after 60 days of immobilization. An increase of the release of fatty acids from adipose tissue was observed in hypokinetic rats, whereas the stimulation of lipolysis by NE was lower in rats exposed to hypokinesia. The binding capacity and the number of beta-adrenergic receptors were found to be decreased in the animals after hypokinesia. In addition, the incorporation of glucose into lipids was increased and the stimulation of lipogenesis by

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insulin was significantly augmented in adipose tissue of rats subjected to hypokinesia. N.B.

A83-47306#

CYTOLOGICAL ASPECTS OF HIGHER PLANT ONTOGENESIS UNDER MICROGRAVITY

K. M. SYTNIK, E. L. KORDIUM, N. A. BELIAVSKAIA, V. A. ZASLAVSKII, E. M. NEDUKHA, V. A. TARASENKO, V. M. FOMICHEVA, and N. G. PALLADINA (Ukrainian Academy of Sciences, Institute of Botany, Kiev, Ukrainian SSR) International Astronautical Federation, International Astronautical Congress, 34th, Budapest, Hungary, Oct. 10-15, 1983. 6 p. refs (IAF PAPER 83-190)

The cell reproduction, differentiation, and vital activity of several plants (*Funaria hygrometrica* protonema, *Pisum sativum*, and *Arabidopsis thaliana*) were investigated in conditions of microgravity (clinostat) and weightlessness (spaceflight on the Salyut 6 space station). Results show that the morphogenesis processes of vegetative and generative organs of these plants were essentially normal under microgravity during the experimental period. The orientation of plant organs in the absence of geotropism under microgravity was found to be governed by phototropisms and chemotropisms. Significant rearrangements were observed in the structural and functional organization of the plant cell, in particular the root meristem and root cap. Also observed were changes in the cell reproduction rate, the chromatin state, the relative electrophoretic mobility of multiple molecular forms of dehydrogenases and their amount, the activity of $\text{Ca}(2+)$ -activated ATPase, the ultrastructure of cytoplasmic organelles, and the frequency of the occurrence of electron-dense globules on membrane components of cells identified as $\text{Ca}(2+)$ binding centers. The adaptive nature of these rearrangements in the plant cell structural and functional organization under microgravity is examined. N.B.

A83-47307#

PRELIMINARY RESULTS OF CYTOS 2 EXPERIMENT

R. TIXADOR, G. RICHOLLEY, G. GASSET, H. PLANEL, N. MOATTI, L. LAPCHINE, L. ENJALBERT (Toulouse III, Université, Toulouse, France), J. RAFFIN (Centre National d'Etudes Spatiales, Toulouse, France), S. N. ZALOGUEV, M. P. BRAGINA (Ministerstvo Zdravookhraneniia SSSR, Institut Mediko-Biologicheskikh Problem, Moscow, USSR) et al. International Astronautical Federation, International Astronautical Congress, 34th, Budapest, Hungary, Oct. 10-15, 1983. 6 p. refs (IAF PAPER 83-192)

Results are presented of the Cytos 2 experiment which studied the antibiotic sensitivity of bacteria cultivated in vitro during the orbital phase of the joint French-Soviet flight on Salyut 7. The method of the measurement of the minimal inhibitory concentration was employed to determine the minimum quantity of antibiotic which stops the bacterial proliferation. Two species of bacteria were tested using various antibiotics: *Escherichia coli* with colistin and kanamycin; and *Staphylococcus aureus* with oxacillin, chloramphenicol, and erythromycin. Results show an increase in the antibiotic resistance for the inflight cells, particularly for *E. coli* and to a lesser extent for *Staphylococcus aureus*. However, ultrastructural investigations of the bacteria following the flight show that the inflight cells have a larger thickness of the cellular envelope. These findings indicate that either a relation exists between the antibiotic penetration and changes in the structure of the cellular envelope, or a relation exists between the increase of the antibiotic resistance and the stimulating effect on the growth rate by the factors of the space environment. N.B.

A83-47612

SHARP RESONANCES IN YEAST GROWTH PROVE NONTHERMAL SENSITIVITY TO MICROWAVES

W. GRUNDLER (Gesellschaft fuer Strahlen- und Umweltforschung, Neuherberg, West Germany) and F. KEILMANN (Max-Planck-Institut fuer Festkoerperforschung, Stuttgart, West Germany) Physical Review Letters (ISSN 0031-9007), vol. 51, Sept. 26, 1983, p. 1214-1216. Research supported by the Deutsche Forschungsgemeinschaft. refs

Microwaves near 42 GHz are found to influence the growth of *Saccharomyces cerevisiae*. The growth is measured photometrically in stirred aqueous culture. The microwave effect occurs and saturates above a threshold intensity much less than 10 mW/sq cm, excluding any explanation based on microwave heating. A surprisingly strong frequency dependence is observed, with resonances as narrow as 8 MHz. These results confirm the existence of a nonthermal resonant microwave sensitivity in biology; they suggest yet unknown tuned systems triggering yet unknown biological actions. Author

A83-47764

EFFECTIVENESS OF HZE-PARTICLES ONTO DIFFERENT BIOLOGICAL SYSTEMS IN THE BIOSTACK EXPERIMENTS ON APOLLO 16, AND 17 AND ON ASTP

J. U. SCHOTT (Deutsche Forschungs- und Versuchsanstalt fuer Luft- und Raumfahrt, Cologne, West Germany) IN: Composition and origin of cosmic rays; Proceedings of the Advanced Study Institute, Erice, Italy, June 20-30, 1982. Dordrecht, D. Reidel Publishing Co., 1983, p. 367-381. refs

A discussion is presented of the Biostack Experiments, which investigated the biological effectiveness of the heavy ion component of cosmic rays during the Apollo 16 and 17 flights and the Apollo-Soyuz Test Project. Biological objects embedded in PVA were sandwiched on track detectors, such as nuclear emulsions, plastics, and AgCl. The biological sheets consisted of different objects such as plant seeds, animal eggs, and bacterial spores. The close combination of biological objects between nuclear track detectors allowed the biological damage observed in discrete objects to be assigned to the passage of single heavy ions. Among the goals of these experiments were the determination of the biological region which has been penetrated by an HZE particle; the determination of the charge, energy, and energy loss of each hitting HZE particle; and an investigation of the radiation effects in each biological object hit by an HZE particle. Results from plant and animal tissues show the important role of the heavy ion component of cosmic rays, especially with respect to radiation risk to humans in space. N.B.

A83-47819

TYPE II COLLAGEN-INDUCED AUTOIMMUNE ENDOLYMPHATIC HYDROPS IN GUINEA PIG

T. J. YOO, Y. YAZAWA, K. TOMODA, and R. FLOYD (Tennessee, University, Center for the Health Sciences; U.S. Veterans Administration Medical Center, Memphis, TN) Science (ISSN 0036-8075), vol. 222, Oct. 7, 1983, p. 65-67. Research supported by the U.S. Veterans Administration, National Institutes of Health, Deafness Research Foundation, and American Otologic Society. refs

A83-48081

REDUCTION OF MOLECULAR SULPHUR BY METHANOGENIC BACTERIA

K. O. STETTER and G. GAAG (Regensburg, Universitaet, Regensburg, West Germany) Nature (ISSN 0028-0836), vol. 305, Sept. 22, 1983, p. 309-311. Research supported by the Deutsche Forschungsgemeinschaft. refs

The influence of molecular sulfur on the growth of methanogenic bacteria was studied by adding sulfur to cultures of 13 different species of methanogenic bacteria. Large quantities of H_2S were produced by all the bacteria, with the greatest amounts being from four thermophilic isolates from volcanic regions. The methanobacteriales and methanococcales order species displayed inhibited CH_4 production when the sulfur was added, while

methanomicrobials was unaffected regarding CH₄ formation. It was concluded that H₂S production by methanogens is a common phenomenon, and that an evolutionary relationship may exist between anaerobic thermoacidophiles and methanogens. M.S.K.

A83-48086

CIRCADIAN CLOCK IN XENOPUS EYE CONTROLLING RETINAL SEROTONIN N-ACETYLTRANSFERASE

J. C. BESHARSE and P. M. IUVONE (Emory University, Atlanta, GA) *Nature* (ISSN 0028-0836), vol. 305, Sept. 8, 1983, p. 133-135. refs

(Contract NIH-EY-02414; NIH-EY-00169)

Serotonin N-acetyltransferase activity in *Xenopus* eye cups maintained in culture has been studied for evidence of an ocular clock, and both sustained oscillation and entrainment of the in vitro system have been found. Experiments were conducted for a normal light-dark schedule, constant darkness for 30 hrs, and a phase reversal; extraneous cues were controlled. The resulting data are presented, providing direct evidence for a circadian clock in the vertebrate eye. C.D.

A83-48087

THE MECHANISM OF KAINIC ACID NEUROTOXICITY

J. GARTHWAITE and G. GARTHWAITE (Liverpool, University, Liverpool, England) *Nature* (ISSN 0028-0836), vol. 305, Sept. 8, 1983, p. 138-140. Research supported by the Medical Research Council. refs

Experiments have been carried out on incubated slices of adult mouse cerebellum to determine the concentrations of kainate which elicit release of endogenous excitant appropriate to the concentrations causing neurotoxic effects, the extent to which D-alpha-aminoadipate inhibits kainate neurotoxicity, and whether the availability of glutamate is a limiting factor for the toxicity of kainate. Histological results are shown and described for a variety of incubation conditions. It is concluded that the lowest concentration of kainate eliciting glutamate release from slices of mouse cerebellum is 50-100-fold higher than the concentrations producing neurotoxic effects against cells innervated by parallel fibers, and that D-alpha-aminoadipate does not attenuate the neurotoxicity of kainate at the concentrations used by Ferkany et al. (1982). Finally, no evidence was obtained that availability of glutamate is a limiting factor in kainate neurotoxicity in the cerebellum. C.D.

A83-48088

ATP-REGULATED K(+) CHANNELS IN CARDIAC MUSCLE

A. NOMA (National Institute for Physiological Sciences, Myodaiji, Okazaki, Japan) *Nature* (ISSN 0028-0836), vol. 305, Sept. 8, 1983, p. 147, 148. refs

Application of the patch-clamp technique to CN-treated mammalian heart cells reveals specific K(+) channels which are depressed by intracellular ATP at levels greater than 1 mM. For these channels, conductance in the outward direction is much larger than for the inward rectifier K(+) channel which is insensitive to ATP. AMP had no effect on the ATP-sensitive K(+) channel and ADP was less effective than ATP. Thus, the ATP-sensitive K(+) channel seems to be important for regulation of cellular energy metabolism in the control of membrane excitability. C.D.

A83-48201

DAMAGES OF THE SUPERHELICAL STRUCTURES OF NUCLEAR DNA BY GAMMA-RAYS AND HEAVY IONS [POVREZHDENIE GAMMA-LUCHAMI I TIAZHELYMI IONAMI SUPERSPIRAL'NYKH STRUKTUR IADERNOI DNK]

KH. ABEL, G. ERTSGREBER, and K. LANGROK (Ob'edinennyi Institut Iadernykh Issledovaniy, Dubna, USSR) *Radiobiologiya* (ISSN 0033-8192), vol. 23, July-Aug. 1983, p. 435-438. In Russian. refs

A83-48202

THE APPLICATION OF METHODS OF THE MATHEMATICAL THEORY OF EXPERIMENT IN THE DEVELOPMENT OF MULTICOMPONENT RADIOPROTECTIVE PREPARATIONS [PRIMENENIE METODOV MATEMATICHESKOI TEORII EKSPERIMENTA PRI RAZRABOTKE MNOGOKOMPONENTNYKH RADIOZASHCHITNYKH RETSEPTUR]

V. G. VLADIMIROV, T. G. ZAITSEVA, I. P. KAMENKO, G. A. PODDUBSKII, G. I. RAZORENOV, S. M. SMIRNOVA, and L. G. TARNOPOLSKAIA (Voenno-Meditsinskaya Akademiya, Leningrad, USSR) *Radiobiologiya* (ISSN 0033-8192), vol. 23, July-Aug. 1983, p. 444-448. In Russian. refs

The possibility of using the mathematical theory of experiment for the development of effective multicomponent radioprotective preparations was investigated. These preparations were based on cystamine or S-(omega-aminopropyl)-beta-aminoethyl thiophosphate with the inclusion of mexamine, ethyrene, and gutimine. These preparations were utilized in order to determine the applicability of this methodological approach for solving problems of the optimization of the composition of multicomponent radioprotective agents according to their effectiveness and toxicity. It was determined that this method of modeling multifactorial radiobiological situations provides an objective technique for analyzing the extremely complex interactions of individual components of radioprotective preparations and optimizing the effectiveness and toxicity of these preparations. N.B.

A83-48203

RADIATION DAMAGE AND THE THEORY OF T-CELLS OF MICE - THE DYNAMICS OF SUPPRESSOR CELLS AFTER THE EFFECT OF RADIATION [RADIATSIONNOE POVREZHDENIE I VOSSTANOVLENIE T-KLETOK MYSHEI DINAMIKA SUPPRESSORNYKH KLETOK POSLE DEISTVIA RADIATSII]

A. A. IARILIN (Akademiya Meditsinskikh Nauk SSSR, Obninsk, USSR) and E. F. POLUSHKINA (Akademiya Meditsinskikh Nauk SSSR, Moscow, USSR) *Radiobiologiya* (ISSN 0033-8192), vol. 23, July-Aug. 1983, p. 454-457. In Russian. refs

A83-48204

THE EFFECT OF BETA-MERCAPTOETHYLAMINE ON THE ACCUMULATION OF DNA STRAND BREAKS IN BAC. STEAROTHERMOPHILUS EXPOSED TO GAMMA-RADIATION, UV RADIATION, AND NITROSOMETHYLUREA TREATMENT [VLIYANIE MEA NA NAKOPLЕНИЕ RAZRYVOV V DNK BAC. STEAROTHERMOPHILUS, OBLUCHENNYKH GAMMA-, UF-RADIATSIIE I IOBRABOTANNYKH NITROZOMETILMOCHEVINOI]

E. A. KUZNETSOVA, L. A. FOMENKO, and A. I. GAZIEV (Akademiya Nauk SSSR, Institut Biologicheskoi Fiziki, Pushchino, USSR) *Radiobiologiya* (ISSN 0033-8192), vol. 23, July-Aug. 1983, p. 462-466. In Russian. refs

A83-48205

THE RADIOSENSITIVITY OF COLONY FORMING UNITS IN DIFFUSE CHAMBERS CONTAINED IN THE BONE MARROW AND THE SPLEEN OF MICE DURING GAMMA-IRRADIATION AT VARIOUS CONDITIONS OF OXYGENATION [RADIOCHUVSTVITEL'NOST' KOE DK, SODERHASHCHIKHSIA V KOSTNOM MOZGE I SELEZENKE MYSHEI, PRI GAMMA-OBLUCHENII RAZLICHNYKH USLOVIAKH OKSIGENATSII]

V. P. KAPLAN, A. I. KOLESNIKOVA, A. G. KONOPLIANNIKOV, N. I. MISHANSKAIA, and L. A. LEPEKHINA (Akademiya Meditsinskikh Nauk SSSR, Obninsk, USSR) *Radiobiologiya* (ISSN 0033-8192), vol. 23, July-Aug. 1983, p. 480-483. In Russian. refs

A83-48206

AGE-RELATED CHARACTERISTICS OF THE POSTIRRADIATION REGENERATION OF THE BLOOD SYSTEM [VOZRAZTNYE OSOBNOSTI POSTLUCHVOI REGENERATSII SISTEMY KROVI]

O. I. BELOUSOVA and M. I. FEDOTOVA (Ministerstvo Zdravookhraneniia SSSR, Institut Biofiziki, Moscow, USSR) Radiobiologiya (ISSN 0033-8192), vol. 23, July-Aug. 1983, p. 530-534. In Russian. refs

The age-related characteristics of the postirradiation recovery of stem hemopoietic cells, medullary hemopoiesis, and the lymphatic organs were investigated in experiments using hybrid (CBA x C57B1) F1 mice at the ages of 2-3 and 27 months. The mice were irradiated with gamma-rays from a Co-60 source at a dose of 4 gram-roentgens at a rate of 1.3 gram-roentgens/min. On various days from 2-45 days following the irradiation, the number of individual cell types in the femoral bone marrow and the lymph organs were determined, as well as the cell types of the stem hemopoietic cells. Results show that the postirradiation recovery of hemopoiesis was similar in both old (27 months) and young (2-3 months) mice, although the old mice exhibited a hypertrophy of several hemopoietic parameters, including erythroid and granulocytic cells of the bone marrow, lymphoid cells of the spleen, and the stem hemopoietic cells. N.B.

A83-48207

THE EFFECT OF MICROWAVE RADIATION ON SEVERAL PARAMETERS OF CELLULAR IMMUNITY IN CONDITIONS OF CHRONIC EXPOSURE [VLIANIE MIKROVOLNOVOGO IZLUCHENIIA NA NEKOTORYE POKAZATELI KLETOCHNOGO IMMUNITETA V USLOVIAKH KHRONICHESKOGO VOZDEISTVIA]

M. G. SHANDALA, G. I. VINOGRADOV, M. I. RUDNEV, and S. F. RUDAKOVA (Kievskii Nauchno-Issledovatel'skii Institut Obshchei i Kommunal'noi Gigieny, Kiev, Ukrainian SSR; Akademiia Meditsinskikh Nauk SSSR, Obninsk, USSR) Radiobiologiya (ISSN 0033-8192), vol. 23, July-Aug. 1983, p. 544-546. In Russian. refs

The effects of a long-term exposure to microwave radiation (7 hr/day and 1 hr/day for 1-3 months at 2375 MHz) of various intensities on the immune system were investigated in experiments using male CBA mice and white rats. The condition of the T-lymphocyte system in the animals was examined for morphological changes. Results show that chronic exposure to microwave radiation at various intensities includes various shifts in the reaction of T-lymphocytes of the peripheral blood of rats and the spleen and lymph nodes of mice. N.B.

A83-48208

THE CORRELATION BETWEEN THE CONDITION OF THE VESTIBULAR ANALYZER OF RABBITS AND THE INDIVIDUAL RADIOSENSITIVITY DURING IRRADIATION AT A DOSE OF 150 GRAM-ROENTGENS [SOOTNOSHENIE MEZHDU SOSTOIANIEM VESTIBULIARNOGO ANALIZATORA KROLIKOV I IKH INDIVIDUAL'NOI RADIOCHUVSTVITEL'NOST'IU PRI OBLUCHENII V DOZE 150 GR]

A. I. GRIGOREV and V. S. STEPANOV (Ministerstvo Zdravookhraneniia SSSR, Institut Biofiziki, Moscow, USSR) Radiobiologiya (ISSN 0033-8192), vol. 23, July-Aug. 1983, p. 549-551. In Russian. refs

A83-48209

THE PHYSICAL WORK CAPACITY OF RATS AFTER THE EFFECT OF IONIZING RADIATION [FIZICHESKAIA RABOTOSPOSOBNOST' U KRYs POSLE VOZDEISTVIA IONIZIRUIUSHCHEI RADIATSII]

N. I. ARLASHCHENKO, D. IA. OPARINA, and V. I. SHEIN Radiobiologiya (ISSN 0033-8192), vol. 23, July-Aug. 1983, p. 551-553. In Russian. refs

The physical work capacity of rats was investigated at various times after gamma-irradiation using several methods to determine the static and dynamic endurance of the animals. The rats were irradiated with Cs-137 at doses of 2.5, 5, 7.5, 10, 12.5, and 15

gram-roentgens at a rate of 0.7 gram-roentgens/sec. The work capacity of the animals was evaluated at various times from 2 min-30 days following the irradiation. Results show that the increase in the radiation dose from 2.5 to 15 gram-roentgens induces a progressive decrease in the dynamic and static physical work capacity of the animals. N.B.

A83-48448

ON THE FUNCTIONAL STATE OF THE PITUITARY-ADRENAL-AXIS IN RATS UNDER DIFFERENT CONDITIONS OF MOTOR ACTIVITY

V. K. PACHEV, L. P. CHERESHAROV, S. I. TOSHKOVA, and N. D. NIKOLOV (B'lgarska Akademiia na Naukite, Tsentralna Laboratoriia za Izhchavane na Moz'ka, Sofia, Bulgaria) Bolgarskaia Akademiia Nauk, Doklady (ISSN 0366-8681), vol. 36, no. 6, 1983, p. 815-817. refs

The extent to which the functions of the pituitary-adrenal axis, under hyperkinetic and hypokinetic motor conditions, differ from those in control animals is examined in experiments using rats. Four groups of rats were examined: systematically locomotor loaded, physiologically immobilized, acutely stressed by electric shocks, and controls. The levels of basal plasma cortisol and ACTH were determined using radioimmunoassay. Results show that the stress evokes a significant activation of the secretion of ACTH and cortisol, which corresponds to the processes characteristic for the general adaptive reaction of the animals. A comparison of the ACTH and cortisol levels in the locomotor-loaded rats with the levels in the other groups shows that locomotor loading for 230 days results in the physiological activation of the adrenal function. It is determined that the intensified ACTH secretion in locomotor deprived animals causes no significant increase in the cortisol level, which indicates that hypokinesia has an unfavorable effect on the secretory capacity of the adrenal cortex. N.B.

A83-48513

BIOSYNTHESIS OF TETRAPYRROL PIGMENTS AS POSSIBLE PRECURSORS OF THE NICKEL-CONTAINING FACTOR F430 OF METHANOSARCINA VACUOLATA [BIOSINTEZ TETRAPYRROL'NYKH PIGMENTOV - VOZMOZHNYKH PREDSHESTVENNIKOV NIKEL'SODERZHASHCHEGO FAKTORA F430 METHANOSARCINA VACUOLATA]

V. IA. BYKHOVSKII, N. I. ZAITSEVA, T. N. ZHILINA, and G. A. ZAVARZIN (Akademiia Nauk SSSR, Institut Biokhimii and Institut Mikrobiologii, Moscow, USSR) Akademiia Nauk SSSR, Doklady (ISSN 0002-3264), vol. 271, no. 2, 1983, p. 470-473. In Russian. refs

A83-48515

COMPLETE CYCLE OF THE INDIVIDUAL DEVELOPMENT OF ARABIDOPSIS THALIANA (L.) HEYNH. PLANTS ABOARD SALYUT-7 [POLNYI TSIKL INDIVIDUAL'NOGO RAZVITIIA RASTENII ARABIDOPSIS THALIANA (L.) HEYNH. NA BORTU ORBITAL'NOI STANTSII 'SALIUT-7']

A. I. MERKIS and R. S. LAURINAVICHUS (Akademiia Nauk Litovskoi SSR, Institut Botaniki, Vilnius, Lithuanian SSR) Akademiia Nauk SSSR, Doklady (ISSN 0002-3264), vol. 271, no. 2, 1983, p. 509-512. In Russian. refs

A83-48565

THE CENTRAL NORADRENERGIC REGULATION OF CEREBRAL BLOOD FLOW [K VOPROSU O TSENTRAL'NOI NORADRENERGICHESKOI REGULIATSII MOZGOVOGO KROVOTOKA]

T. V. BALUEVA (Nauchno-Issledovatel'skii Neirokhirurgicheskii Institut, Leningrad, USSR) Fiziologicheskii Zhurnal SSSR (ISSN 0015-329X), vol. 69, July 1983, p. 913-917. In Russian. refs

The effect of stimulating the locus coeruleus with rectangular pulses of current (30 GHz, 1.5 msec, 5 V) on the arterial pressure, the blood flow to the cerebrum by the carotid arteries, and the local cerebral blood flow in the parietal region was investigated. The experiments utilized anesthetized cats following upper cervical sympathectomy. The stimulation evoked an increase in the arterial

pressure and increases in the blood flow in the carotid arteries and the local blood flow in the cerebrum. When the arterial pressure was stabilized by pressostate, the same stimulation evoked an increase in the blood flow to the cerebrum and an increase in the local cerebral blood flow with a latent period of 2 sec. These findings indicate that the intracerebral noradrenergic system exerts the direct neurogenic control of the tonus of the cerebral vessels. N.B.

A83-48566

THE INTERACTION OF CARDIAC VENTRICLES IN INTACT DOGS DURING 3-5 DAYS OF HIGH ALTITUDE ADAPTATION [VZAIMOVLIANIE ZHELUDOKHOV SERDTSIA U INTAKTNYKH SOBAK NA 3-5-DNI VYSOKOGORNOI ADAPTATSII]

A. KH. KARASAEVA (Akademiia Nauk Kirgizskoi SSR, Institut Fiziologii i Experimental'noi Patologii Vysokogor'ia, Frunze, Kirgiz SSR) Fiziologicheskii Zhurnal SSSR (ISSN 0015-329X), vol. 69, July 1983, p. 919-924. In Russian. refs

The intracardiac hemodynamics of dogs born at a low altitude (760 m) and at a middle altitude (1800 m) were investigated using a catheter method during 3-5 days of adaptation to high altitude conditions (3200 m). The high altitude adaptation was accompanied in the dogs born at the low altitude by an increase in the function of the right ventricle with an increase in the end-diastolic pressure in both ventricles. In the dogs born at the middle altitude, the high altitude adaptation was accompanied by an increase in the function of the left ventricle, also with an increase in the end-diastolic pressure in both ventricles. It is concluded that the hyperfunction of one cardiac ventricle evokes a decrease in the function of the opposite ventricle. N.B.

A83-48567

THE PHYSIOLOGICAL MECHANISMS FOR SUPPLYING THE ENERGY REQUIREMENTS OF AN ORGANISM DURING A DECREASE IN THE CONCENTRATION OF HEMOGLOBIN IN THE BLOOD [O FIZIOLOGICHESKIKH MEKHAJIZMAKH OBESPECHENIIA ENERGETICHESKIKH POTREBNOSTEI ORGANIZMA PRI UMEN'SHENII KONTSENTRATSII GEMOGLOBINA V KROVI]

K. P. IVANOV, A. E. CHUIKIN, O. V. BERKOS, and A. L. STOLBOV (Akademiia Nauk SSSR, Institut Fiziologii, Leningrad, USSR) Fiziologicheskii Zhurnal SSSR (ISSN 0015-329X), vol. 69, July 1983, p. 942-948. In Russian. refs

A83-48568

CHANGES IN THE MICROCIRCULATION IN MESENTERY RATS DURING HYPEROXIA [IZMENENIIA MIKROTSIRKULIATSII V BRYZHEIKE KRYA PRI GIPEROKSII]

S. G. TOPOROVA (Tadzhikskii Gosudarstvennyi Meditsinskii Institut, Dyushanbe, Tadzhik SSR) Fiziologicheskii Zhurnal SSSR (ISSN 0015-329X), vol. 69, July 1983, p. 951-954. In Russian.

A83-48675

THE HUMORAL IMMUNE RESPONSE AFTER INJURIES OF VARIOUS SEVERITIES [GUMORAL'NYI IMMUNNYI OTVET POSLE TRAVMY RAZLICHNOI TIAZHESTI]

V. N. ALEKSANDROV (Voenno-Meditsinskaiia Akademiia, Leningrad, USSR) Patologicheskaiia Fiziologii i Eksperimental'naia Terapiia (ISSN 0031-2991), July-Aug. 1983, p. 70-73. In Russian. refs

The reaction of the humoral component of the immune response to mechanical injuries of different severities was investigated in experiments using (CBA x C57BL/6) F1 mice. The injuries were induced by squeezing the soft tissue of both femurs with a force of 600-1800 g/sq cm. At various times following the injury, the mice were immunized with sheep erythrocytes and the number of antibody-forming cells were determined. Results show that a moderate injury evoked a stimulation of the immune response, while a severe injury produced an inhibition of the immune response. Thymocyte retention in the thymus and significant destruction of cells in the spleen were observed, which were morphological equivalents of immunosuppression. N.B.

A83-48876

PATHOPHYSIOLOGIC EFFECTS OF ACCELERATION STRESS IN THE MINIATURE SWINE

J. W. BURNS, W. M. WITT, J. P. ELLIS, JR. (USAF, School of Aerospace Medicine, Brooks AFB, TX), M. H. LAUGHLIN (USAF, School of Aerospace Medicine, Brooks AFB, TX; Oral Roberts University, Tulsa, OK), and J. T. YOUNG (USAF, School of Aerospace Medicine, Brooks AFB, TX; Dow Chemical Co., Midland, MI) Aviation, Space and Environmental Medicine (ISSN 0095-0562), vol. 54, Oct. 1983, p. 881-893. refs

The pathophysiologic effect of the cardiovascular system, in particular the myocardium, of miniature swine exposed to the acceleration stress of repeated simulated aerial combat maneuvers (SACM) was investigated. One group of the animals was exposed to 5 SACM/day for 1 day, while the three other groups were exposed to 5 SACM/day three times per week for 1 week, 1 month, and 6 months. The SACM was 100 sec in length and comprised two 5 sec +9Gz peaks. The control group was exposed to 1 day of 5 100-sec +1Gz exposures. Results show that the subendocardial hemorrhage and myocyte damage were greatest in the control and the 1 day exposure groups, declining to the lowest values in the 6 month group. Additional experiments were conducted to determine hematocrit and plasma levels of catecholamines, cortisol, and protein during SACM. A decline was found in macroscopic and microscopic myocardial damage during the time frame of the decline in heart rate, arrhythmias, norepinephrine, epinephrine, and cortisol, which suggests a causative relationship. This decline also indicates that the injury observed during +Gz exposures is the result of the emotional stress of handling restraint, and the unfamiliar environment of the centrifuge and +Gz, to which the animal becomes accustomed with time. N.B.

A83-48881* National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.

EFFECT OF CONFINEMENT IN SMALL SPACE FLIGHT SIZE CAGES ON INSULIN SENSITIVITY OF EXERCISE-TRAINED RATS

C. E. MONDON, C. B. DOLKAS, and G. M. REAVEN (NASA, Ames Research Center, Biomedical Research Div., Moffett Field; U.S. Veterans Administration Medical Center, Palo Alto, CA) Aviation, Space and Environmental Medicine (ISSN 0095-0562), vol. 54, Oct. 1983, p. 919-922. Research supported by the U.S. Veterans Administration and NASA. refs

The effect of confinement in small cages (simulating the size to be used in future space Shuttle missions) on insulin sensitivity was studied in rats having an increased insulin sensitivity due to exercise training prior to confinement. Oral glucose tolerance tests (OGTT) were given to both control and exercise-trained rats before and after placement in the small cages for 7 days. The insulin resistance was assessed by the product of the area of the insulin and glucose curves of the OGTT (IG index). Results show that the values obtained before confinement were one-half as high in exercise-trained rats as those in control rats, reflecting an increased sensitivity to insulin with exercise training. After 7 days confinement, the IG index was found to be not significantly different from initial values for both control and exercise-trained rats. These findings suggest that increased insulin sensitivity in exercise-trained rats persists 7 days after cessation of running activity. The data also indicate that exercise training, before flight, may be beneficial in minimizing the loss of insulin sensitivity expected with decreased use of gravity dependent muscles during exposure to hypogravity in space flight. N.B.

A83-49073

THE WALLS OF VESSELS IN ATHEROGENESIS AND THROMBOGENESIS (INVESTIGATIONS IN THE USSR) [STENKA SOSUDOV V ATERO- I TROMBOGENEZE /ISSLEDOVANIIA V SSSR/]

E. I. CHAZOV, ED. and V. N. SMIRNOV, ED. Moscow, Izdatel'stvo Meditsina, 1983, 208 p. In Russian.

A collection of articles is presented concerning recent research on the structural and functional organization of vascular wall

components. The characteristics of the endothelial structure of the arteries of humans and experimental animals are analyzed, and quantitative and qualitative evaluations are given of the endothelial lesions at various stages of atherosclerosis. Data concerning the composition and morphological heterogeneity of human aorta intimal and medial cells are examined. Attention is given to studies of high and low density lipoproteins, as well as to their component lipids and proteins. Also examined are the molecular and cellular mechanisms of the interaction of thrombocytes with elements of the vascular wall. The adhesion of thrombocytes in zones of wall lesions is considered, and the action of hemodynamic factors on the aggregation properties of thrombocytes is evaluated. No individual items are abstracted in this volume N.B.

A83-49546

THE ACTION OF PALMITATE ON THE ENERGY COUPLING IN MITOCHONDRIA OF THE SKELETAL MUSCLES AND LIVER [DEISTVIE PAL'MITATA NA ENERGETICHESKOE SOPRIAZHENIE V MITOKHONDRIAKH SKELETNYKH MYSHTS I PECHENI]

N. D. ALTUKHOV, G. P. KIRILLOVA, E. N. MOKHOVA, and V. P. SKULACHEV (Gosudarstvennyi Tsentral'nyi Institut Fizicheskoi Kul'tury; Moskovskii Gosudarstvennyi Universitet, Moscow, USSR) Akademii Nauk SSSR, Doklady (ISSN 0002-3264), vol. 271, no. 5, 1983, p. 1254-1256. In Russian. refs

The influence of palmitate on the energy coupling in the mitochondria of the skeletal muscles and liver of rats was investigated in order to determine whether skeletal muscle mitochondria possess a high sensitivity to the isolated action of fatty acids. The results indicate that the mitochondria of the skeletal muscles possess a far greater sensitivity to the isolated action of palmitate than do the mitochondria of the liver. This high sensitivity confirms the hypothesis that the mitochondria of the skeletal muscles may be endogenous activators of noncontractile thermogenesis in this tissue. These results demonstrate that the high sensitivity of skeletal muscle mitochondria to fatty acids should be taken into account in interpreting data concerning the influence of long-term cold-temperature adaptation on the energy coupling. N.B.

A83-49620

GLUTATHIONE REDUCTASE IN EVOLUTION

J. L. RENDON (Universidad Nacional Autonoma de Mexico, Villa Obregon, Mexico), M. ONDARZA (California, University, La Jolla, CA), and R. N. ONDARZA Journal of Molecular Evolution (ISSN 0022-2844), vol. 19, Sept. 1983, p. 371-375. Research supported by the Centro de Investigacion en Quimica Aplicada. refs

The disulfide reducing activities of GSSG- and CoASSG-reductases were measured on partially purified extracts from a variety of prokaryotes and eukaryotes. Glutathione-reductase was found in varying amounts in all eukaryotes and prokaryotes, used in this study, with the exception of the two strict anaerobes *Clostridium tartarivorum* and *Desulfovibrio vulgaris*, and the two primitive Archaeobacteria *Methanosarcina barkeri* and *Halobacterium halobium*. CoASSG-reductase was found in some eukaryotes and prokaryotes, but showed no clear pattern of distribution other than its absence whenever GSSG-reductase was not present. The absence of GSSG-reductase activity in organisms lacking GSH, confirms that glutathione metabolism is not universal and suggests that this enzyme might be useful as a marker in classifying organisms. The data suggest that glutathione-reductase occurs as a result of the change from a reducing to an oxidizing atmosphere in the primitive earth. Author

A83-50075

THE FUNCTIONAL SYSTEM OF ANTIGRAVITATION [FUNKTSIONAL'NAIA SISTEMA ANTIGRAVITATSII]

G. S. BELKANIIA Moscow, Izdatel'stvo Nauka (Problemy Kosmicheskoi Biologii. Volume 45), 1982, 288 p. In Russian. refs

The functional organization of the reaction of animals and humans to terrestrial gravity is investigated. Experimental results

are presented concerning the characteristics of the functional condition of the main physiological systems in monkeys during orthostatic influences, and the effect of functional, pharmacological, and pathological factors on the condition of orthostatic regulation is analyzed. Topics examined include the interaction of living organisms with terrestrial gravitational surroundings, the systemic reaction of monkeys to gravitational influences during orthostasis and its main indicators, the analysis of the regulatory mechanisms of the systemic reaction of organisms to orthostatic influences, the condition of various physiological functions in monkeys during motion sickness, and the modeling of the physiological effects of a decreased gravitation in experiments using monkeys. N.B.

N83-35606# Joint Publications Research Service, Arlington, Va. USSR REPORT: SPACE BIOLOGY AND AEROSPACE MEDICINE, VOL. 17, NO. 3, MAY - JUNE 1983

O. G. GAZENKO, ed. 6 Jul. 1983 158 p refs Transl. into ENGLISH of Kosmich. Biol. i Aviakosmich. Med. (Moscow), v. 17, no. 3, May - Jun. 1983 96 p (JPRS-83828) Avail: NTIS HC A08

Developments in space biology and aerospace medicine are addressed. Determination of the radiation hazard encountered in space and physiological responses to spaceflight are emphasized.

N83-35612# Joint Publications Research Service, Arlington, Va. MYOELECTRIC ACTIVITY OF THE RAT DUODENUM UNDER HYPOKINETIC CONDITIONS

A. N. PETRUSENKO In its USSR Rept.: Space Biol. and Aerospace Med., Vol. 17, No. 3, May - Jun. 1983 (JPRS-83828) p 38-41 6 Jul. 1983 refs Transl. into ENGLISH from Kosmich. Biol. i Aviakosmich. Med. (Moscow), v. 17, no. 3, May - Jun. 1983 p 30-32 Avail: NTIS HC A08

The bioelectrical activity of the duodenum, which occupies a prominent place in coordination of function of the hepato- and pancreato-duodenal regions was studied under restricted motor activity (RMA) conditions. Electrical activity of the duodenum was recorded using bipolar platinum electrodes implanted under the serous membrane in the duodenal wall. A Mingograph-81 instrument was used to record the tracings. Parameters of bioelectric activity studied include: amplitude and frequency of slow electric waves (SEW), number of spikes per group per SEW, active phase of migrating myoelectric complex, which is the bioelectrical analog of the interdigestion periodic motor activity. It is concluded that contractility of the duodenum is depressed under the influence of RMA. J.M.S.

N83-35613# Joint Publications Research Service, Arlington, Va. ENERGETIC REACTIONS IN RAT SKELETAL MUSCLES AFTER FLIGHT IN COSMOS-1129 BIOSATELLITE

E. S. MAILYAN, L. B. BURAVKOVA, and L. V. KOKOREVA In its USSR Rept.: Space Biol. and Aerospace Med., Vol. 17, No. 3, May - Jun. 1983 (JPRS-83828) p 42-47 6 Jul. 1983 refs Transl. into ENGLISH from Kosmich. Biol. i Aviakosmich. Med. (Moscow), v. 17, no. 3, May - Jun. 1983 p 32-36 Avail: NTIS HC A08

The polarographic analysis of biological oxidation in rat skeletal muscles after the 18.5 day flight revealed changes specific for the flight animals: oxidative phosphorylation uncoupling, distinct inertness of energy accumulation 10 hrs after recovery. Tissue respiration inhibition occurred in both flight and synchronous rats suggesting the effect of other than weightlessness factors. In the flight animals the parameters of energy metabolism returned to the prelaunch level within a longer (29 days) time than in the synchronous rats (6 days). Muscles of different function (predominance of fast or slow fibers) showed similar responses of energy metabolism to weightlessness, i.e., inhibition of the intensity and decrease of the energy efficiency of oxidative processes. Author

N83-35629# Joint Publications Research Service, Arlington, Va.
SEVENTH ALL-UNION CONFERENCE ON SPACE BIOLOGY AND AEROSPACE MEDICINE

In its USSR Rept.: Space Biol. and Aerospace Med., Vol. 17, No. 3, May - Jun. 1983 (JPRS-83828) p 139-150 6 Jul. 1983 refs Transl. into ENGLISH from Kosmich. Biol. i Aviakosmich. Med. (Moscow), v. 17, no. 3, May - Jun. 1983 p 88-94
 Avail: NTIS HC A08

The conference addressed techniques developed to examine the health status and work capacity of cosmonauts and the application of these techniques to public health practice. Methods of evaluating the state of the cardiovascular system, fluid electrolyte metabolism, renal function, and endocrine regulation by means of functional load tests were discussed. These topics covered include the mechanism of functional change in the cardiovascular system under hypokinetic and orthostatic conditions, screening scientists cosmonauts for long term spaceflight, psychophysiology, and results of scientific technical and experimental research onboard the Salyut 6 orbital station. In the area of hygiene, the gas atmosphere of habitable pressurized compartments, the toxicology of polymers, and the microbiological status of cosmonauts and the microflora of the body were addressed. Finally, the effects of dynamic spaceflight factors on the body, radiobiology, and vestibular reactions in short and long term spaceflight were considered. J.M.S.

N83-35630# Army Research Inst. of Environmental Medicine, Natick, Mass.

RELATIONSHIP BETWEEN RAT HEAT STRESS MORTALITY AND ALTERATIONS IN RETICULOENDOTHELIAL CARBON CLEARANCE FUNCTION

D. A. DUBOSE, M. MCCREARY, L. SOWDERS, and L. GOODE
 15 Mar. 1983 25 p refs
 (AD-A127836; USARIEM-M-13/83) Avail: NTIS HC A02/MF A01 CSCL 06S

It has recently been reported that, although bacterial endotoxins of intestinal origin are not associated with death after experimental rat heat stress, a state of endotoxin tolerance significantly decreases the heat stress mortality rate. To determine if this phenomenon were associated with the ability of endotoxins to stimulate clearance by the reticuloendothelial system (RES), the relationship between rat heat stress mortality and carbon clearance by the RES was examined. RES carbon clearance was stimulated by prior treatment with endotoxin, zymosan, or sublethal heat stress, as indicated by the significantly reduced ($p < 0.05$) blood carbon concentrations 15 mins. post carbon injection. Prior treatment with injections of gelatin blocked RES carbon clearance. Rats subjected to endotoxin or sublethal heat treatment were significantly ($p < 0.05$) resistant to the experimental heat stress, whereas zymosan treatment had no effect. Blockade of the RES with gelatin significantly ($p < 0.05$) increased the heat stress mortality rate. These data compare favorably with previously reported studies evaluating RES function and mortality after experimental injury and shock and indicate that the RES may play a fundamental role in the pathogenesis of and tolerance to experimental heat stress.

GRA

N83-35631# California Univ., Berkeley. Lawrence Berkeley Lab. Chemical Biodynamics Div.

PATH OF CARBON: FROM STRATOSPHERE TO CELL

M. CALVIN Jan. 1983 54 p refs Presented at the 15th Symp. on Advances in Gene Technol.: Molecular Genetics of Plants and Animals, Miami, Fla., 17-21 Jan. 1983 Submitted for publication

(Contract DE-AC03-76SF-00098)
 (DE83-009947; LBL-15715; CONF-830137-1) Avail: NTIS HC A04/MF A01

A history of the evolution of knowledge of how plants manufacture from carbon dioxide and water all their substances is presented. A route is traced to a totally synthetic system which will use sunlight to generate fuel and chemicals. DOE

N83-36268# Hokkaido Univ., Sapporo (Japan).

FUNDAMENTAL STUDIES FOR TREATMENT OF SULFATE BY MICROORGANISM. OPTIMUM CONDITION FOR BACTERIAL REDUCTION OF SULFATE ION IN SINGLE STAGE CONTINUOUS TREATMENT

A. OKAMURA, H. MORITA, M. TSURUI, and T. TAKAMORI *In its* Bull. of the Fac. of Eng., Hokkaido Univ., No. 115 p 23-34 Jul. 1983 refs In JAPANESE; ENGLISH summary
 (REPT-1) Avail: NTIS HC A05/MF A01

Treatment of gypsum by sulfate-reducing bacteria with continuous culture was studied, and the following results were obtained. (1) The amount of reduced sulfate at a pH in the range of pH 5.7 to pH 6.8 could be expressed in terms of HCl demand for pH-stat. (2) Arrhenius' plot could be adapted to the relationship between the maximum specific titration rate of 1 N HCl and temperature. (3) The maximum growth rate obtained was 0.211 (1/hr) under the conditions of 30 C and pH 6.8 with batch culture. The optimum condition for reduction of sulfate ion with single stage continuous culture was as follows; temperature: 30 C, pH: 6.8 and mean residence time: 8.1(hr). And the reduction rate of sulfate ion was 1.0 (mmol/1-hr) under the optimum condition. (4) Model parameters were determined from experimental data with batch and continuous culture, and the simulation results were in good agreement with the experimental data. Author

N83-36623# Joint Publications Research Service, Arlington, Va.
USSR REPORT: LIFE SCIENCES. BIOMEDICAL AND BEHAVIORAL SCIENCES, NO. 41

12 Sep. 1983 93 p refs Transl. into ENGLISH from various Russian articles

(JPRS-84296) Avail: NTIS HC A05

This serial report contains news items, abstracts and articles of scientific reports on aspects of biomedical and behavioral sciences including aerospace medicine, biophysics, food technology, genetics, laser effects, marine mammals, microbiology, and veterinary medicine.

N83-36625# Joint Publications Research Service, Arlington, Va.
USSR REPORT: LIFE SCIENCES. BIOMEDICAL AND BEHAVIORAL SCIENCES, NO. 44

11 Oct. 1983 84 p refs Transl. into ENGLISH from various Russian articles

(JPRS-84505) Avail: NTIS HC A05

This serial report contains news items, abstracts, and articles of scientific reports on aspects of biomedical and behavioral sciences including aerospace medicine, agrotechnology, biochemistry, biophysics, epidemiology, microbiology, genetics, public health, toxicology and immunology.

N83-36630*# George Washington Univ., Washington, D.C. Science Communication Studies.

BIOMEDICAL RESEARCH PUBLICATIONS, 1982 - 1983 Final Report

C. BOLCIK and L. G. PLEASANT Washington NASA Oct. 1983 51 p

(Contract NASW-3165)

(NASA-CR-3739; NAS 1.26:3739) Avail: NTIS HC A04/MF A01 CSCL 06B

Cardiovascular deconditioning, motion sickness, bone alterations, muscle atrophy, blood cell alterations, fluid and electrolyte changes, radiation effects and protection, behavior and performance, and general biomedical research are covered in a bibliography of 444 items. N.W.

51 LIFE SCIENCES (GENERAL)

N83-36631# Desmatics, Inc., State College, Pa.
STATISTICAL IMPACT ACCELERATION INJURY PREDICTION MODELS BASED ON -GX ACCELERATION DATA AND INITIAL HEAD CONDITIONS

K. C. BURNS and D. E. SMITH May 1983 21 p refs
(Contract N00014-79-C-0128)
(AD-A129353; TR-112-13) Avail: NTIS HC A02/MF A01 CSCI 12A

Statistical impact acceleration injury prediction models are developed using data from 23 high-level -G sub X acceleration runs. These runs involve Rhesus monkeys with securely restrained torsos and unrestrained heads. The models are based on peak acceleration and initial head conditions. The model predictions are compared with those given in an earlier report based on different data and an estimate of Fisher's information matrix is used to evaluate the relative worth of the two data bases.

Author (GRA)

N83-36632# Army Aeromedical Research Lab., Fort Rucker, Ala.

DEVELOPMENT OF THE SWINE AS A LARGE ANIMAL FOR NOISE RESEARCH

M. ETTINGER, D. L. CURD, and J. H. PATTERSON, JR. May 1983 29 p refs
(Contract DA PROJ. 3M1-61102-BS-10)
(AD-A129694; USAARL-83-9) Avail: NTIS HC A03/MF A01 CSCI 14B

This report describes an attempt to develop the swine as a large animal model to be used in research on noise induced hearing loss. Animals were trained to perform in a yes-no signal detection paradigm for heat as a positive reinforcement. Results indicate that the animals can learn this task; however, the method failed to produce an audiogram. This was attributed to a failure to induce an adequate motivational level in the subjects.

GRA

N83-36633# California Univ., San Diego. Inst. of Marine Resources.

ALGAE FROM THE ARID SOUTHWESTERN UNITED STATES: AN ANNOTATED BIBLIOGRAPHY

W. H. THOMAS and S. R. GAINES Jun. 1983 144 p
(Contract DE-AC02-77CH-00178)
(DE83-011976; SERI/STR-231-1947) Avail: NTIS HC A07/MF A01

Desert algae are attractive biomass producers for capturing solar energy through photosynthesis of organic matter. They are probably capable of higher yields and efficiencies of light utilization than higher plants, and are already adapted to extremes of sunlight intensity, salinity and temperature such as are found in the desert. An annotated bibliography of the literature on algae from the arid southwestern United States is presented. Isolation of desert algae and their yields in the laboratory are studied which is necessary prior to setting up outdoor algal culture ponds. Desert areas are attractive for such applications because land, sunlight, and, to some extent, water resources are abundant there.

DOE

N83-36634# Argonne National Lab., Ill.
DIVISION OF BIOLOGICAL AND MEDICAL RESEARCH ANNUAL TECHNICAL REPORT, 1982

M. W. ROSENTHAL, ed. May 1983 160 p
(Contract W-31-109-ENG-38)
(DE83-015756; ANL-83-40) Avail: NTIS HC A08/MF A01

Studies in Carcinogenesis address mechanisms of chemical and radiation carcinogenesis including the processes of tumor initiation and promotion were reported. The rat liver and mouse skin models and human rodent cell culture systems were studied. The use of liposomes for metal mobilization is also explored. Low level radiation studies include delineation of the hematopoietic and other responses of dogs to continuous low level gamma irradiation, comparison of lifetime effects in mice of low level neutron and gamma irradiation, and study of the genetic effects of high LET radiation. Molecular Biology research developed two dimensional electrophoresis systems for diagnosis and detection of cancer and other diseases. Fundamental structural and

biophysical investigations of immunoglobulins and other key proteins, studies of cell growth, and of molecular and cellular effects of solar UV light are included. Research in toxicology uses cellular, physiological, whole animal, and chronobiological endpoints and chemical separations to elucidate mechanisms and evaluate hazards of coal conversion byproducts, actinides, and toxic metals. Support facilities, educational activities, seminars, staff talks, staff, and funding agencies are reported.

DOE

N83-36635# Oklahoma State Univ., Stillwater.
FACTORS CONTROLLING BLUE-GREEN ALGAE DOMINANCE IN A SOUTHWESTERN RESEVOIR

D. TOETZ Mar. 1983 48 p refs
(Contract DI-14-34-0001-1138)
(PB83-208892; W83-03109; OWRT-A-106-OKLA(1)) Avail: NTIS HC A03/MF A01 CSCI 06C

Blue-green algae dominate eutrophic impoundments in summer and may contribute nitrogen (N) to the N budget of the lake through nitrogen fixation (NF). The objective of this study was to determine how NF was controlled by the environment and how it was correlated with changes in algal community structure in Lake Hefner, Oklahoma, during the summer of 1981.

Author (GRA)

N83-36636# Joint Publications Research Service, Arlington, Va.
USSR REPORT: SPACE BIOLOGY AND AEROSPACE MEDICINE, VOL. 17, NO. 4, JULY - AUGUST 1983

O. G. GAZENKO, ed. 27 Sep. 1983 152 p refs Transl. into ENGLISH of Kosmich. Biol. i Aviakosmich. Med. (Moscow), v. 17, no. 4, Jul. - Aug. 1983 95 p
(JPRS-84412) Avail: NTIS HC A08

Research and development in space biology and aerospace medicine are reported. Topics discussed include: medical support of aviation and space missions; work and rest during long term spaceflights; pre and post flight ophthalmology; effects of hypokinesia-orthostatic stability; effects of weightlessness; biochemical effects; gravity effects on early embryogenesis; biological effects of high voltage stationary electric fields; nutrition; waste treatment for biological life support systems; circadian cycle and work shifts; genetics; long term effects; central nervous system and the change in organ and tissue iodine content during exposure to variable magnetic fields.

N83-36643# Joint Publications Research Service, Arlington, Va.
MORPHOMETRIC AND GRAVIMETRIC STUDY OF RAT HEART DURING LONG-TERM HYPOKINESIA

A. S. KAPLANSKIY, G. N. DURNOVA, and Y. I. ILINA-KAKUYEVA In its USSR Rept.: Space Biol. and Aerospace Med., Vol. 17, No. 4, Jul. - Aug. 1983 (JPRS-84412) p 36-40 27 Sep. 1983 refs Transl. into ENGLISH from Kosmich. Biol. i Aviakosmich. Med. (Moscow), v. 17, no. 4, Jul. - Aug. 1983 p 25-28

Avail: NTIS HC A08

Hearts of adult rats submitted to 30, 60, 90, 120 and 165 day hypokinesia were examined by histological, morphometric and massmetric methods. It is found that prolonged hypokinesia delayed rat growth and terminated heart growth. It is noted that the delayed increase of the heart mass of hypokinetic rats is induced by the discontinued growth of cardiomyocytes. The growth of the right and the left heart is inhibited in a similar degree.

E.A.K.

N83-36644# Joint Publications Research Service, Arlington, Va.
LYMPHOID ORGANS OF MONKEYS SUBMITTED TO ANTIORTHOSTATIC HYPOKINESIA (EXPERIMENTAL MORPHOLOGICAL STUDY)

G. N. DURNOVA and A. S. KAPLANSKIY In its USSR Rept.: Space Biol. and Aerospace Med., Vol. 17, No. 4, Jul. - Aug. 1983 (JPRS-84412) p 41-47 27 Sep. 1983 refs Transl. into ENGLISH from Kosmich. Biol. i Aviakosmich. Med. (Moscow), v. 17, no. 4, Jul. - Aug. 1983 p 28-32

Avail: NTIS HC A08

The thymus, spleen and inguinal lymph nodes of monkeys exposed to head down tilt for 7 or 19 days were studied. It was shown that the exposure caused an acute stress which resulted

in the thymus involution and hypoplasia of the lymphoid tissue of the spleen and lymph nodes. The exposure produced fluid redistribution which caused the spleen blood content to decrease and the mass of inguinal lymph nodes to increase. This was induced by partial pooling of the lymph flowing from the lower extremities. The exposure also led to autoimmune developments. It is indicated that long term hypokinesia may lead to decline of resistance to infection, impairment of immunobiological reactivity and allergization of the body. E.A.K.

N83-36645# Joint Publications Research Service, Arlington, Va.
EFFECT OF SPACEFLIGHT ABOARD COSMOS-1129 BIOSATELLITE ON ENZYME ACTIVITY IN RAT LIVER

S. NEMETH and R. A. TIGRANYAN *In its* USSR Rept.: Space Biol. and Aerospace Med., Vol. 17, No. 4, Jul. - Aug. 1983 (JPRS-84412) p 48-53 27 Sep. 1983 refs Transl. into ENGLISH from Kosmich. Biol. i Aviakosmich. Med. (Moscow), v. 17, no. 4, Jul. - Aug. 1983 p 33-37
 Avail: NTIS HC A08

After the 18.5 day Cosmos-1129 flight the activity of 7 glucocorticoid-stimulated enzymes of the rat liver was measured. Immediately postflight the activity of tyrosine aminotransferase, tryptophan pyrolyase and serine dehydrogenase increased. These enzymes rapidly (within several hours) react to increased glucocorticoids. The activity of aspartate and alanine aminotransferases also increased. These enzymes require many days of a continuous effect of glucocorticoids. The glycogen concentration in the rat liver also grew. At R+6 the activity of tryptophan pyrolyase and serine dehydrogenase decreased and that of the other enzymes returned to normal. The immobilization stress applied postflight led to an increased activity of tyrosine aminotransferase and tryptophan pyrolyase. Evidence is given that after space flight rats are in an acute stress state, evidently, produced by the biosatellite recovery. R.J.F.

N83-36646# Joint Publications Research Service, Arlington, Va.
ROLE OF GRAVITY IN EARLY EMBRYOGENESIS OF THE TELEOST, BRACHIDANIO RERIO

Y. M. CHERDANTSEVA *In its* USSR Rept.: Space Biol. and Aerospace Med., Vol. 17, No. 4, Jul. - Aug. 1983 (JPRS-84412) p 54-59 27 Sep. 1983 refs Transl. into ENGLISH from Kosmich. Biol. i Aviakosmich. Med. (Moscow), v. 17, no. 4, Jul. - Aug. 1983 p 37-40
 Avail: NTIS HC A08

The effect of turning and clinostating exposures on the early embryogenesis of the teleost *B. rerio* was investigated. The eggs turned immediately after fertilization with their animal pole downwards and kept so till the formation of the axial complex developed in an absolutely normal way. Most eggs also developed normally during clinostating, when kept in the inclined and horizontal clinostats. During this exposure eggs of some clutches perished. They were those eggs which were unable to develop near the lower limits of the temperature range characteristic of *B. rerio* development (18-19.5 C). Direct involvement of environment factors in primary egg polarization (i.e., establishment of its polarity and bilateral organization) is unlikely, if only by virtue of variability of such factors. Gravity is the only exception, and the question of its involvement in early morphogenesis of animals definitely requires further investigation. Author

N83-36647# Joint Publications Research Service, Arlington, Va.
EFFECT OF CENTRIFUGING ON EARLY EMBRYOGENESIS OF THE TELEOST, BRACHIDANIO RERIO

Y. M. CHERDANTSEVA *In its* USSR Rept.: Space Biol. and Aerospace Med., Vol. 17, No. 4, Jul. - Aug. 1983 (JPRS-84412) p 60-65 27 Sep. 1983 refs Transl. into ENGLISH from Kosmich. Biol. i Aviakosmich. Med. (Moscow), v. 17, no. 4, Jul. - Aug. 1983 p 41-45
 Avail: NTIS HC A08

The early embryogenesis of the teleost *Brachidanio rerio* was shown to be resistant to centrifugation. Beginning with the blastula stage, the development proceeds normally in 90% embryos centrifuged at 500 g for 1 h. Beginning with early developmental

stages, embryos grow and develop normally when exposed to long-term centrifugation at 50 g. The exposure produces partial inhibitions of cytotomy (with nuclear division continued). This effect changes the proportions of the cellular and syncytial fractions of the embryo (blastoderm and periblast). The exposure to centrifugation also reveals the dorsoventral asymmetry of egg surface tension. Resistance to centrifugation is attributed to the fact that the polarization control is beyond the cell embryonic fraction. R.J.F.

N83-36649# Joint Publications Research Service, Arlington, Va.
FREE AND PROTEIN-BOUND PLASMA CORTICOSTERONE IN WHITE RATS IN THE PRESENCE OF HYPOXIA AND AFTER ADMINISTRATION OF ADRENOCORTICOTROPIC HORMONE

G. K. ABASHEVA and L. M. MIKHNEVA *In its* USSR Rept.: Space Biol. and Aerospace Med., Vol. 17, No. 4, Jul. - Aug. 1983 (JPRS-84412) p 70-74 27 Sep. 1983 refs Transl. into ENGLISH from Kosmich. Biol. i Aviakosmich. Med. (Moscow), v. 17, no. 4, Jul. - Aug. 1983 p 47-50
 Avail: NTIS HC A08

It was demonstrated that the plasma ratio of free and protein-bound corticosterone depends on the hypoxic degree. After two-hour hypoxia at an altitude of 10,000 m the trained and untrained animals exhibit a similar content of the free hormone (21%), with the content of total corticosterone being significantly lower in the trained rats. A study of variations in the content of free corticosterone rates exposed to hypoxia for 20, 45 and 120 minutes and adrenocorticotropin (ACTH) administration during the same time intervals showed that the binding capacity of transcortine changes 45 minutes after the beginning of hypoxia. R.J.F.

N83-36650# Joint Publications Research Service, Arlington, Va.
SOME BIOLOGICAL EFFECTS OF HIGH-VOLTAGE STATIONARY ELECTRIC FIELDS

V. V. ANTIPOV, N. N. DOBROV, V. I. DROBYSHEV, L. V. KOROLEVA, M. D. NIKITIN, S. V. PETRUKHIN, L. A. SEMENOVA, and V. P. FEDOROV *In its* USSR Rept.: Space Biol. and Aerospace Med., Vol. 17, No. 4, Jul. - Aug. 1983 (JPRS-84412) p 75-80 27 Sep. 1983 refs Transl. into ENGLISH from Kosmich. Biol. i Aviakosmich. Med. (Moscow), v. 17, no. 4, Jul. - Aug. 1983 p 50-54
 Avail: NTIS HC A08

Experiments were carried out on 345 white mice using hematological and pathomorphological procedures. The constant electric field (CEF) was generated in a special laboratory device. The exposure to CEF of 50 and 100 kV/m for 20 s caused hematological and morphological changes typical of the anxiety stage of the adaptation syndrome. The exposure also produced morphological changes of reactive and destructive type in skeletal muscles and different segments of kinesthetic receptors. The level of the above changes appears to be directly related to the CEF strength. Author

N83-36651# Joint Publications Research Service, Arlington, Va.
VARIATION PULSIMETRY IN EVALUATING THE EFFECTS OF STATIONARY MAGNETIC FIELDS ON CARDIAC FUNCTION

N. P. SMIRNOVA *In its* USSR Rept.: Space Biol. and Aerospace Med., Vol. 17, No. 4, Jul. - Aug. 1983 (JPRS-84412) p 81-87 27 Sep. 1983 refs Transl. into ENGLISH from Kosmich. Biol. i Aviakosmich. Med. (Moscow), v. 17, no. 4, Jul. - Aug. 1983 p 54-59
 Avail: NTIS HC A08

By variation pulsometry changes in the cardiac rhythm of 30 rats exposed to a constant magnetic field (CMF) were examined. Three stages different in statistical parameters were distinguished: transient process when the electromagnet is turned on; shift of variation curves of the cardiac intervals to the right and development of bradycardia during exposure to CMF of 0.4 T (10-30 min) and 1.6 T (3 h); adaptation and rearrangement of the cardiac rhythm towards a higher frequency during and after 24 h exposure to CMF of 1.6 T. In some cases atropine prevented bradycardia during CMF exposure. In most rats under nembutal anesthesia the exposure caused an opposite effect, i.e., shift of

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variation curves of the cardiac intervals to the left and increase in heart rate. Author

N83-36655# Joint Publications Research Service, Arlington, Va.
MEASUREMENT OF STROKE AND MINUTE VOLUMES IN MONKEYS BY MEANS OF THORACIC TETRAPOLAR RHEOGRAPHY

G. S. BELKANIYA and V. A. DARTSMELIYA *In its* USSR Rept.: Space Biol. and Aerospace Med., Vol. 17, No. 4, Jul. - Aug. 1983 (JPRS-84412) p 113-117 27 Sep. 1983 refs Transl. into ENGLISH from Kosmich. Biol. i Aviakosmich. Med. (Moscow), v. 17, no. 4, Jul. - Aug. 1983 p 75-78
Avail: NTIS HC A08

At the present time the most important significance is attributed to determination of stroke and minute volumes for evaluation of hemodynamics. For this reason, development of noninvasive methods acquires special importance, since they permit taking prolonged and repeated measurements of the most important cardiodynamic parameters. Determination of cardiac output by the method of thoracic tetrapolar rheography is one of the methods in current use that best meets the requirements for clinical tests and chronic experiments. Tetrapolar wiring of a biological object involves separate connection of generator and measuring circuits. The results of numerous studies have shown that the measuring electrodes are then situated in the region of a uniform high-frequency electric field, and this justifies calculation of stroke volume on the basis of Ohm's law, which relates voltage, current and impedance. B.W.

N83-36657# Joint Publications Research Service, Arlington, Va.
RAT THYROID HORMONES FOLLOWING FLIGHT ABOARD COSMOS-936 BIOSATELLITE

J. KNOPP, L. MACHO, R. A. TIGRANYAN, N. F. KALITA, and V. STRBAK *In its* USSR Rept.: Space Biol. and Aerospace Med., Vol. 17, No. 4, Jul. - Aug. 1983 (JPRS-84412) p 126-128 27 Sep. 1983 refs Transl. into ENGLISH from Kosmich. Biol. i Aviakosmich. Med. (Moscow), v. 17, no. 4, Jul. - Aug. 1983 p 83-84
Avail: NTIS HC A08

Histological studies of the rat thyroid after long term spaceflights revealed that there were some morphological signs of diminished function of this gland (reduction in volume of thyrocyte nuclei, shortening of epithelium, consolidation of colloid), as well as decrease in number and volume of C cell nuclei 5-12 h after landing. These changes were not present 25 days after the flight. It was found that thyroxine (T sub 4) entration of cosmonauts' blood plasma was increased on the concluding day of 13 day missions aboard Apollo, but 1 day after the flight there was complete normalization of T sub 4 level. analogous results were obtained for cosmonauts on the Skylab orbital station, in whom some decrease in blood plasma triiodothyronine (T sub 3) concentration was also demonstrated after 28-, 56- and 84-day missions, as well as elevation of thyrotropic hormone (TTH) level in 5 out of 9 cosmonauts. B.W.

N83-36658# Joint Publications Research Service, Arlington, Va.
EFFECT OF LONG-TERM SPACEFLIGHT ON CATECHOLAMINE CONTENT OF ISOLATED NUCLEI OF RAT BRAIN

R. KVETNANSKY, R. A. TIGRANYAN, and J. CULMAN *In its* USSR Rept.: Space Biol. and Aerospace Med., Vol. 17, No. 4, Jul. - Aug. 1983 (JPRS-84412) p 129-132 27 Sep. 1983 refs Transl. into ENGLISH from Kosmich. Biol. i Aviakosmich. Med. (Moscow), v. 17, no. 4, Jul. - Aug. 1983 p 84-86
Avail: NTIS HC A08

A prolonged spaceflight is associated with numerous factors that affect neuroendocrine reactions. For this reason, it is quite justified to assume that changes occur in catecholamine (CA) metabolism in the brain under the influence of spaceflight factors. Considering current knowledge about the numerous functions of different parts of the brain, investigation of CA metabolism in the whole stem and hypothalamus is less informative and satisfactory. In recent years, good results have been obtained by the method of isolation of individual nuclei from different brain structures. The

studies of CA metabolism in the rat hypothalamus, which were pursued in an experiment aboard Cosmos-1129 biosatellite, revealed that only some parts of the hypothalamus reacted in the form of change (drop) in CA level after the spaceflight, mainly the nucleus arcuatus, nucleus periventricularis and eminentia medialis. Author

N83-36659# Joint Publications Research Service, Arlington, Va.
CHROMOSOME ABERRATIONS IN BONE MARROW CELLS OF RATS SUBMITTED TO HYPERBARIC OXYGENATION

Y. P. GUSKOV *In its* USSR Rept.: Space Biol. and Aerospace Med., Vol. 17, No. 4, Jul. - Aug. 1983 (JPRS-84412) p 133-135 27 Sep. 1983 refs Transl. into ENGLISH from Kosmich. Biol. i Aviakosmich. Med. (Moscow), v. 17, no. 4, Jul. - Aug. 1983 p 87-88
Avail: NTIS HC A08

The genetic sequelae of hyperbaric oxygenation (HBO) have not been sufficiently investigated. An attempt was made here to demonstrate in rat bone marrow cells the cytogenetic consequences of HBO combined with the anticarcinogen, sarcolysin. Author

N83-36660# Joint Publications Research Service, Arlington, Va.
EFFECT OF LONG-TERM ADMINISTRATION OF OBSIDAN ON RAT RESISTANCE TO HYPOXIA AND THROMBOCYTE AGGREGATION DURING ADAPTATION TO MODERATE ALTITUDE (1600 METERS)

M. A. ALIYEV, V. A. LEMESHENKO, A. K. BEKBOLOTOVA, and G. K. RYSKULOVA *In its* USSR Rept.: Space Biol. and Aerospace Med., Vol. 17, No. 4, Jul. - Aug. 1983 (JPRS-84412) p 136-139 27 Sep. 1983 refs Transl. into ENGLISH from Kosmich. Biol. i Aviakosmich. Med. (Moscow), v. 17, no. 4, Jul. - Aug. 1983 p 88-90
Avail: NTIS HC A08

Adaptation of animals to moderate and high altitudes improves their resistance to hypoxia. The combination of adaptation to altitude and certain pharmacological agents enhances even more animal resistance. It is known that aggregation of thrombocytes induced by ADP and epinephrine is inhibited by a beta adrenoreceptor blocking agent, such as propranolol (obsidan, nderal). It depresses the release reaction, has a nonspecific effect on thrombocyte membranes, diminishing their adhesiveness. The object here was to determine the antihypoxia and antiaggregation properties of obsidan when given once and for a long period of time under two different ecological conditions, in the plains (Frunze) and at moderate altitude. B.W.

N83-36661# Joint Publications Research Service, Arlington, Va.
ROLE OF CENTRAL NERVOUS SYSTEM IN CHANGING ORGAN AND TISSUE IODINE CONTENT DURING EXPOSURE TO VARIABLE MAGNETIC FIELD

N. V. MARASAKOVA *In its* USSR Rept.: Space Biol. and Aerospace Med., Vol. 17, No. 4, Jul. - Aug. 1983 (JPRS-84412) p 140-143 27 Sep. 1983 refs Transl. into ENGLISH from Kosmich. Biol. i Aviakosmich. Med. (Moscow), v. 17, no. 4, Jul. - Aug. 1983 p 90-92
Avail: NTIS HC A08

Several researchers have noted the high sensitivity of the autonomic nervous system to magnetic fields (MF). In particular, it was demonstrated that the hypothalamus affects the thyroid via the hypophysis: increase in thyroid SH groups under the effect of exposure of the rat head to a variable magnetic field (VMF). In previous studies the compensatory effect of VMF with intensity of 0.11 mT and frequency of 50 Hz on parameters of protein and carbohydrate metabolism in rat blood serum, on levels of copper and iodine in organs in the case of 3 day exposure to VMF was demonstrated. It was also reported that there was activation of the thyroid with 60 day exposure to VMF of rats kept on their regular diet. An additional study was demonstrated to determine the role of the CNS in changing iodine content of organs and tissues during exposure to VMF. B.W.

N83-36662# Joint Publications Research Service, Arlington, Va.
USSR REPORT: LIFE SCIENCES. BIOMEDICAL AND BEHAVIORAL SCIENCES, NO. 43

5 Oct. 1983 95 p refs Transl. into ENGLISH from various Russian articles

(JPRS-84475) Avail: NTIS HC A05

Research and development studies in the USSR were undertaken in many areas in the life sciences discipline. Subject matter covered includes: agrotechnology; biochemistry; food technology; genetics; immunology; laser effects; medicine; microbiology; molecular biology; pharmacology and toxicology; and public health.

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AEROSPACE MEDICINE

Includes physiological factors; biological effects of radiation; and weightlessness.

A83-47097

THE LEVEL OF RISK AT VARIOUS CONDITIONS OF RADIATION ACTION [UROVNI RISK A PRI RAZLICHNYKH USLOVIAKH LUCHEVOGO VOZDEISTVIA]

IU. I. MOSKALEV and V. F. ZHURAVLEV Moscow, Energoatomizdat, 1983, 112 p. In Russian. refs

Current ideas about the biological effects of radiation are examined for a wide range of doses, and data concerning the level of risk for various situations are presented. Several aspects concerning the evaluation of the consequences of radiation action on humans at various levels of radiation doses are discussed, and the levels of risk for the action of nonradiation and radiation factors are examined. Attention is given to problems of setting norms and protection levels in both usual and extreme conditions. Topics addressed include the level of risk from the natural radiation background, natural sources of radiation, radiation from atomic explosions and atomic energy, and radiation from medical procedures and equipment. N.B.

A83-47101

METHODS OF INCREASING THE TOLERANCE OF HUMANS TO ACUTE HYPOXIA [PUTI POVYSHENIIA USTOICHIVOSTI CHELOVEKA K OSTROI GIPOKSII]

N. A. AGADZHANIAN and A. IU. KATKOV (Universitet Druzhby Narodov, Moscow, USSR) Fiziologiya Cheloveka (ISSN 0131-1646), vol. 9, July-Aug. 1983, p. 519-526. In Russian. refs

It is determined that the tolerance of humans to acute hypoxia can be increased to an equal extent with the aid of high-altitude adaptation, altitude chamber training, or alimentary fasting. The antihypoxic effectiveness of high-altitude adaptation and altitude chamber training can be explained by the increase in the delivery of oxygen to tissues of the vital organs. This is accomplished by improving the blood supply while decreasing the blood supply to the peripheral tissues, as well as by increasing the pulmonary ventilation and the speed of the blood flow. The antihypoxic effectiveness of alimentary fasting can be explained, depending on its length, either by metabolic acidosis (up to the acidosis crisis) or by an expressed decrease in the oxygen demand (after the acidosis crisis). N.B.

A83-47102

CLINICAL POSSIBILITIES IN THE EVALUATION OF EXTREME EFFECTS [VOZMOZHNOSTI KLINIKI V OTSENKE EKSTREMAL'NYKH VOZDEISTVII]

A. K. GUSKOVA, V. V. BLAGOVESHCHENSKAIA, and V. V. MALAKHOVA Fiziologiya Cheloveka (ISSN 0131-1646), vol. 9, July-Aug. 1983, p. 527-531. In Russian. refs

The main directions of future research concerning the evaluation of combined deleterious effects on humans and the delimitation of adaptive and pathological reactions of humans in response to

extreme effects are discussed. A unified program using dynamic observations for investigating individuals undergoing extreme effects is proposed. The directions for these investigations are the accumulation of information about and the study of the minor deviations in the condition of healthy humans, the investigation of the condition of healthy humans, the evaluation of the adaptive possibilities in extreme conditions of sick humans, and the investigation and development of an effective method for stimulating the compensatory mechanisms and the utilization of reserve possibilities of humans. N.B.

A83-47103

THE DAILY FOOD RATION AND THE ASCORBIC ACID SUPPLY OF THE HUMAN BODY DURING WORK IN AN ARID ZONE [SUTOCHNYI RATSION PITANIIA I OBESPECHENOST' ASKORBINOVOI KISLOTOI ORGANIZMA CHELOVEKA PRI RABOTE V USLOVIAKH ARIDNOI ZONY]

I. M. MOMMADOV and V. A. GRAFOVA (Akademiia Nauk Turkmenskoi SSR, Institut Fiziologii i Eksperimental'noi Patologii Aridnoi Zony, Ashkhabad, Turkmen SSR) Fiziologiya Cheloveka (ISSN 0131-1646), vol. 9, July-Aug. 1983, p. 532-536. In Russian. refs

A83-47104

THE CONTENT OF GONADOTROPIN HORMONES AND HYDROCORTISONE IN WOMEN DURING ADAPTATION TO CONDITIONS OF HIGH LATITUDES [SODERZHANIE GONADOTROPNYKH GORMONOV I KORTIZOLA U ZHENSCHIN V PROTSESSE ADAPTATSII K USLOVIAM VYSOKIKH SHIROT]

N. V. SHVAREVA and A. V. TKACHEV (Akademiia Nauk SSSR, Institut Biologicheskikh Problem Severa, Magadan, USSR) Fiziologiya Cheloveka (ISSN 0131-1646), vol. 9, July-Aug. 1983, p. 537-544. In Russian. refs

A83-47105

THE FUNCTIONAL SYSTEM OF HUMAN THERMAL ADAPTABILITY [FUNKTSIONAL'NAIA SISTEMA TERMOADAPTIVNOSTI CHELOVEKA]

V. A. MAKSIMOVICH (Nauchno-Issledovatel'skii Institut Gigieny Truda i Profzabolevanii, Donetsk, Ukrainian SSR) Fiziologiya Cheloveka (ISSN 0131-1646), vol. 9, July-Aug. 1983, p. 545-549. In Russian. refs

The physiological mechanisms of human thermal adaptability (the capability of the human body to increase its tolerance to ergothermal effects such as the combination of work with a heated microclimate) are examined. The interrelation of thermal adaptability with indicators of starting and situational afferentation, memory, decision taking, response formation, feedback, and the acceptor of the adaptive result. The dependence of changes in the thermal tolerance of the human body on its initial level, thermal adaptability, and the physiological strength of the ergothermal effects are analyzed. The practical significance of these patterns for physiological studies is discussed. N.B.

A83-47106

THE REGULATION OF THE HEAT CONTENT OF THE BODY [REGULIATSIIA TEPLOSODERZHANIIA TELA]

N. A. SLEPCHUK and K. P. IVANOV (Akademiia Nauk SSSR, Institut Fiziologii, Leningrad, USSR) Fiziologiya Cheloveka (ISSN 0131-1646), vol. 9, July-Aug. 1983, p. 550-556. In Russian. refs

It is shown that at a surrounding temperature of 23.7 ± 0.3 C, the introduction of heat in the quantity of 53.5 ± 1.7 cal/kg is accompanied in humans by the occurrence of a vascular thermoregulatory reaction in their hands. This quantity of heat was introduced by having the subjects drink 300 ml of water at a temperature of 50-53 C. The temperature of the middle finger was raised by 2-7 C by this procedure. When the temperature in the experimental chamber was 14.8 ± 0.3 C, the subjects needed to receive 69.7 ± 0.9 cal/kg in order to evoke a vasodilation reaction. It is demonstrated that this reaction occurred as a result of the subject receiving a specific quantity of heat,

and not due to the effect of temperature or the volume of water ingested. N.B.

A83-47107

AN ANALYSIS OF THE CIRCADIAN RHYTHM OF PHYSIOLOGICAL FUNCTIONS IN SAILORS PERFORMING WATCH DUTIES [ANALIZ SUTOCHNYKH RITMOV FIZIOLOGICHESKIKH FUNKTSII PRI VAKHTENNOM REZHIME RABOT U MORIAKOV]

A. S. POROSHENKO (Ministerstvo Zdravookhraneniia SSSR, Nauchno-Issledovatel'skii Institut Gigieny Vodnogo Transporta, Moscow, USSR) and A. A. SOROKIN (Akademiia Nauk Kirgizskoi SSR, Institut Fiziologii i Eksperimental'noi Patologii Vysokogor'ia, Frunze, Kirgiz SSR) Fiziologiya Cheloveka (ISSN 0131-1646), vol. 9, July-Aug. 1983, p. 557-561. In Russian. refs

A83-47108

THE INVOLUNTARY REGULATION OF THE GSR [PROIZVOL'NAIA REGULIATSIIA AMPLITUDY KGR]

A. N. AVSARKISIAN, A. N. BORGEST, V. G. MARKMAN, and E. N. STARKOVA (Akademiia Nauk SSSR, Institut Fiziologii, Leningrad, USSR) Fiziologiya Cheloveka (ISSN 0131-1646), vol. 9, July-Aug. 1983, p. 579-583. In Russian. refs

The possibility of using external feedback to regulate the 'evoked' galvanic skin response (GSR), which arises during the fulfillment of a task at the time of the response, is studied in experiments using healthy humans. In the first group, the subjects were presented an original curve on the oscilloscope screen which reflected the variation of the GSR (true feedback). In the second group, the subjects were shown curves which imitated the GSR of the first group (false feedback). Subjects from both groups were instructed to reduce the amount of variation in the curves they observed. Results show the possibility of the involuntary suppression of the evoked GSR. A comparison of findings from both groups indicates that external feedback plays an important role in this process. The interaction of external feedback with various nonspecific effects is examined. N.B.

A83-47109

THE DEPENDENCE OF THE CHARACTERISTICS OF THE SLOW PHASE OF THE GALVANIC NYSTAGMUS ON THE ELECTRICAL STIMULATION PARAMETERS [ZAVISIMOST' KHARAKTERISTIK MEDLENNYKH FAZ GAL'VANICHESKOGO NISTAGMA OT PARAMETROV ELEKTROSTIMULIATSII]

IU. B. DORMASHEV and V. IA. ROMANOV (Moskovskii Gosudarstvennyi Universitet, Moscow, USSR) Fiziologiya Cheloveka (ISSN 0131-1646), vol. 9, July-Aug. 1983, p. 593-601. In Russian. refs

An investigation is presented of the characteristics of the galvanic nystagmus in the current range of 1-7 mA with direct and reverse polarity using an electromagnetic method for registering the eye movements. A close connection of the nystagmus parameters was found with the strength and direction of the electrical stimulation for the slow phase of the galvanic nystagmus. The character of the dependence of the galvanic nystagmus indicators on the electrical stimulation was determined not only by its parameters but also by the asymmetry in the direction and the level of the background eye movement activity. N.B.

A83-47110

A MODEL OF THE WORKING OF A BINOCULAR VISUAL SYSTEM IN THE PROCESS OF VOLUME PERCEPTION [MODEL' RABOTY BINOKULIARNOI ZRITEL'NOI SISTEMY V PROTSESSE VOSPRIATIIA OB'EMA]

V. M. KROL (Akademiia Nauk SSSR, Institut Problem Upravleniia, Moscow, USSR) Fiziologiya Cheloveka (ISSN 0131-1646), vol. 9, July-Aug. 1983, p. 602-608. In Russian. refs

The principles of the working of a model of stereoperception, which is carried out by the visual system of humans, is examined. An analysis is presented of the causes for the disorders of volume perception in the case of several forms of strabismus. The process of the volume perception of a three-dimensional scene on the basis of information contained in two plane retinal images is

discussed. The essence of the model consists in the process of the identification of pairs of fragments of two monocular images. N.B.

A83-47111

MATHEMATICAL MODELS OF THE READAPTATION OF THE HUMAN VISUAL ANALYZER FOLLOWING SHORT LIGHT FLASHES [MATEMATICHESKIE MODELI READAPTATSII ZRITEL'NOGO ANALIZATORA CHELOVEKA POSLE KRATKOVREMENNYKH SVETOVYKH VOZDEISTVII]

V. V. KOLBANOV and G. I. RAZORENOV (Voenno-Meditsinskaiia Akademiia, Leningrad, USSR) Fiziologiya Cheloveka (ISSN 0131-1646), vol. 9, July-Aug. 1983, p. 609-612. In Russian. refs

A83-47112

THE CHANGES IN THE CARDIAC RHYTHM OF AIR TRAFFIC CONTROLLERS USING AUTOMATED SYSTEMS [OB IZMENENIIAKH SERDECHNOGO RITMA U DISPATCHEROV AVTOMATIZIROVANNYKH SISTEM UPRAVLENIIA VOZDUSHNYM DVIZHENIEM]

L. A. NECHAEVA and V. A. POLIANTSEV (Moskovskii Meditsinskii Stomatologicheskii Institut, Moscow, USSR) Fiziologiya Cheloveka (ISSN 0131-1646), vol. 9, July-Aug. 1983, p. 613-618. In Russian. refs

The patterns of cardiac rhythm were investigated for the air traffic controllers at an airport in the Soviet Union who were utilizing automated systems. The cardiac interval tracings showed repeated pairs, triads, and other groupings of the R-R interval, and these data were compared with the work load of the controllers. It was determined that repeats of the cardiac intervals were most frequently observed in the controllers during the periods of the heaviest work loads. The percentage of controllers having a rapid heart rate increased among the total number having repeated R-R groups during these periods. A relationship was found between the neighboring R-R intervals, which indicated the great variability of the significance of the R-R interval in the period of low work loads, as well as the very small dispersion of the cardiac intervals during periods of high numbers of airplanes. It is concluded that these patterns in the changes of the cardiac rhythm of air traffic controllers are characteristic also for operators of other professions. N.B.

A83-47113

THE RELATIONSHIP BETWEEN BLOOD FLOW, PARTIAL PRESSURE, AND OXYGEN DEMAND IN THE HUMAN CORTEX (A THEORY OF TISSUE GAS EXCHANGE) [O SOOTNOSHENII MEZHDU KROVOTOKOM, PARTSIAL'NYM DAVLENIEM I POTREBLENIIEM KISLORODA V KORE GLOVNOVOGO MOZGA CHELOVEKA /K TEORII TKANEVOGO GAZOOBMENA/]

E. I. PALTSEV (Akademiia Nauk SSSR, Institut Problem Peredachi Informatsii, Moscow, USSR) Fiziologiya Cheloveka (ISSN 0131-1646), vol. 9, July-Aug. 1983, p. 619-626. In Russian. refs

A83-47114

THE MORPHOFUNCTIONAL REORGANIZATION OF THE VESSELS OF THE MICROCIRCULATORY BED UNDER THE INFLUENCE OF LOCAL COOLING [MORFOFUNKTSIONAL'NAIA PERESTROIKA SOSUDOV MIKROTSIRKULIATORNOGO RUSLA POD VLIANIEM LOKAL'NOGO OKHLAZHDENIIA]

V. I. KOZLOV (Akademiia Pedagogicheskikh Nauk SSSR, Moscow, USSR) and M. V. POPOV (Arkhangelskii Gosudarstvennyi Meditsinskii Institut, Arkhangelsk, USSR) Fiziologiya Cheloveka (ISSN 0131-1646), vol. 9, July-Aug. 1983, p. 627-633. In Russian. refs

A83-47115

THE CONDITION OF THE PULMONARY BLOOD FLOW AND CENTRAL HEMODYNAMICS IN HEALTHY HUMANS DURING THE BREATHING OF A HELIUM-OXYGEN MIXTURE [SOSTOIANIE LEGOCHNOGO KROVOTOKA I TSENTRAL'NOI GEMODINAMIKI U ZDOROVYKH LIUDEI VO VREMIA DYKHANIYA GELII-KISLORODNOI SMESI]

E. G. KOSTYLEV and A. G. EROPKINA (Ministerstvo Zdravookhraneniia RSFSR, Nauchno-Issledovatel'skii Institut Proktologii, Moscow, USSR) Fiziologiya Cheloveka (ISSN 0131-1646), vol. 9, July-Aug. 1983, p. 634-638. In Russian. refs

A83-47116

THE EFFECT OF THE NEUROPEPTIDES VASOPRESSIN AND FRAGMENTS OF CORTICOTROPHIN ON THE CARDIOVASCULAR AND RESPIRATORY SYSTEM OF HUMANS AT REST AND DURING PHYSICAL LOADING [VLIANIE NEIROPETIDOV VAZOPRESSINA I FRAGMENTOV KORTIKOTROPINA NA SERDECHNO-SOSUDISTUII I DYKHATEL'NUII SISTEMY CHELOVEKA V POKOE I PRI FIZICHESKOI NAGRUZKE]

V. D. BAKHAREV, N. V. ZGODA, V. I. BURAVTSOV, V. N. NEZAVIBATKO, O. S. PAPSUEVICH, P. V. ZAGRIADSKII, and S. M. TIKHOMIROV (Voenno-Meditsinskaiia Akademiia, Leningrad, USSR) Fiziologiya Cheloveka (ISSN 0131-1646), vol. 9, July-Aug. 1983, p. 639-644. In Russian. refs

A83-47117

THE REGULATION BY THE HUMAN FOOT OF THE BALANCE OF THE MECHANICAL SYSTEM OF THE 'INVERTED PENDULUM' TYPE. I - THE SIGNIFICANCE OF THE SPEED OF MOTION. II - THE ROLE OF THE POSITION OF THE CENTER OF GRAVITY AND TEMPORAL PROGRAMS [REGULIATSIIA STOPOI CHELOVEKA RAVNOVESIIA MEKHANICHESKOI SISTEMY TIPA 'PEREVERNUTYI MAIATNIK. I - ZNACHENIE SKOROSTI DVIZHENIIA. II - ROL' POLOZHENIIA TSENTRA TIAZHESTI I VREMENNYKH PROGRAMM]

B. N. SMETANIN (Akademiia Nauk SSSR, Institut Problem Peredachi Informatsii, Moscow, USSR) and M. A. ALEKSEEV Fiziologiya Cheloveka (ISSN 0131-1646), vol. 9, July-Aug. 1983, p. 653-668. In Russian. refs

An investigation was conducted which showed how the 'speed of motion' parameter is used during the control of an unstable mechanical system consisting of a footpedal and a perpendicular steel bar with a weight on the end attached to the pedal. It is established that the perfect skill for damping the pendulum oscillations is characterized by the directed central motor command. In these conditions, the speed is under uninterrupted control. In addition, an investigation of the control of this unstable mechanical system shows that at least two types of feedback mechanisms participate in this process. One of these mechanisms is based on the speed of motion, while the other is based on the spatial position of the general center of gravity of the system relative to the zone of balance. The relative significance of these feedback mechanisms change during the course of the working of the control habit. A special role in the control of the pendulum oscillations is played by the temporal programs formed during the process of motion. N.B.

A83-47118

THE EFFECT OF CALCIUM IONS ON THE TEMPERATURE SENSITIVITY OF HUMANS [VLIANIE IONOV KAL'TSIIA NA TEMPRATURNUII CHUVSTVITEL'NOST' CHELOVEKA]

T. V. KOZYREVA (Akademiia Meditsinskikh Nauk SSSR, Novosibirsk, USSR) Fiziologiya Cheloveka (ISSN 0131-1646), vol. 9, July-Aug. 1983, p. 671, 672. In Russian. refs

The effect of free calcium ions on the functioning of the temperature analyzer was investigated in experiments using healthy males 25-40 years of age at normal room temperature (24-25 C). Local iontophoresis of CaCl_2 was conducted on a portion of skin 36 sq cm on the inner surface of the left forearm following the injection of calcium ions (0.018 mg/kg body weight). The current employed was approximately 4-5 mA for a period of 20 min. The

quantity of sensitive cold points on the inner surface of the forearm was measured along with the skin temperature. Results show that an increase in the concentrations of free ions of calcium in the blood exerts an effect on the functioning of the temperature analyzer of humans, evoking an increase in its sensitivity to cold. N.B.

A83-47119

THE EFFECT OF SUDDEN CHANGES OF THE GEOMAGNETIC FIELD ON SEVERAL PHYSIOLOGICAL INDICATORS OF HEALTHY HUMANS [VLIANIE VNEZAPNYKH IZMENENII GEOMAGNITNOGO POLIA NA NEKOTORYE FIZIOLOGICHESKIE POKAZATELI ZDOROVOGO ORGANIZMA]

O. S. RAEVSKAIA and G. V. RYZHIKOV (Akadeiia Meditsinskikh Nauk SSSR, Moscow, USSR) Fiziologiya Cheloveka (ISSN 0131-1646), vol. 9, July-Aug. 1983, p. 675-677. In Russian. refs

The changes in the energy of the alpha, beta, and theta rhythms of the background EEG and EKG were investigated in healthy males 19-26 years of age during various conditions of the geomagnetic field. It was found that increases in the energy of the alpha rhythms and especially the theta rhythms occurred during sudden and significant changes in the field strength. Tests indicate that the EEG values of healthy individuals increase during days of high-amplitude low-frequency rhythms. The EKG values show that significant decreases in the variability of the R-R interval are simultaneously observed. The registered changes were found to have individual variability. It is proposed that changes in the geomagnetic field evoke a condition of emotional stress in healthy humans. N.B.

A83-47120

THE DETERMINATION OF THE CARDIAC OUTPUT DURING PHYSICAL LOADING OF INCREASING STRENGTH BY A MODIFIED REBREATHING METHOD [OPREDELENIE SERDECHNOGO VYBROSA PRI FIZICHESKOI NAGRUZKE VOZRASTAIUSHCHEI MOSHCHNOSTI MODIFITSIROVANNYM METODOM VOZVRATNOGO DYKHANIYA]

V. V. GRITSENKO, V. I. GAVRILENKO, and O. I. MOCHALOV (Leningradskii Meditsinskii Institut, Leningrad, USSR) Fiziologiya Cheloveka (ISSN 0131-1646), vol. 9, July-Aug. 1983, p. 678-680. In Russian. refs

A modified rebreathing method is developed for analyzing the cardiac output during physical loading of increasing strength. It is found that the repeated use of a gas mixture (7 percent CO_2 in O_2) in a breathing bag during rebreathing in conditions of increasing physical loading from 25-150 V enables the researcher to obtain accurate values of the CO_2 tension of mixed venous blood (PvCO_2). The initial partial pressure of CO_2 (PCO_2) is similar to the PvCO_2 values at rest and at the initial physical loading level. The increase in the concentration of CO_2 in the breathing bag with every subsequent loading during rebreathing allows the equivalence of PCO_2 and PvCO_2 to be maintained during the investigation. N.B.

A83-47303#

RESULTS OF SPACE EXPERIMENT PROGRAM 'INTERFERON' M. TALAS, L. BATKAI, I. STAGER, K. NAGY (Orszagos Kozegeszsegugyi Intezet, Budapest, Hungary), L. HIROS (Medicor Works, Budapest, Hungary), I. KONSTANTINOVA, M. RYKOVA, I. MOZGOVAIA, O. GUSEVA, and V. KOZHARINOV (Ministerstvo Zdravookhraneniia SSSR, Institut Mediko-Biologicheskikh Problem, Moscow, USSR) International Astronautical Federation, International Astronautical Congress, 34th, Budapest, Hungary, Oct. 10-15, 1983. 13 p. refs (IAF PAPER 83-187)

The production of interferon by human lymphocytes was examined in microgravity conditions on-board the Salyut-6 space station in 1980 and 1981 as part of the Intercosmos program by two different crews. Tubes containing a human lymphocyte suspension and head-reservoirs filled with interferon inducers were placed on the launch vehicle 7 hr before lift-off. The substances were mixed or stored after mating with the space station, then returned to earth a week later with the reentry vehicle. A third

trial was performed in which cosmonauts' blood was taken before, during, and after spaceflight. The interferon was studied for antiviral activity, natural killer cytotoxicity, and template activity. The interferon was viable after a 7-day space flight. Cosmonaut production of interferon was reduced, and exhibited recovery only in one astronaut once on the ground. NK-cell activity was also depressed in three out of four cosmonauts after returning to the ground. M.S.K.

A83-47308#

CARDIOVASCULAR EXPLORATION IN MICROGRAVITY. FRENCH-SOVIET FLIGHT ABOARD SALIOUT VII - JUNE 1982

L. POURCELOT, J.-M. POTTIER, F. PATAT, PH. ARBEILLE (Tours, Universite, Tours, France), A. KOTOVSKAIA, A. GUENIN, A. SAVILOV, U. BYISTROV, O. GOLOVKINA (Ministerstvo Zdravookhraneniia SSSR, Institut Mediko-Biologicheskikh Problem, Moscow, USSR), R. BOST (Centre National d'Etudes Spatiales, Paris and Toulouse, France) et al. International Astronautical Federation, International Astronautical Congress, 34th, Budapest, Hungary, Oct. 10-15, 1983. 15 p. refs (IAF PAPER 83-194)

The effect of weightlessness on the cardiovascular system of humans was investigated using a specially-designed ultrasound system during the Salyut VII space flight (June 1982). This ultrasound device is able to visualize the heart and the vessels, record the movement of the cardiac structures, and provide the needed parameters for blood flow in the superficial vessels. Measurements were obtained on 30 and 3 days preflight, on day 2, 3, 4, and 6 during the flight, and on day 1, 3, and 60 after landing. Results indicate an increase in the cardiac output and heart rate during weightlessness, as well as an increase of the left atrium and left ventricle diameters, the stability of myocardial contractility, disturbances in venous flow and vascular compliance, changes in the peripheral resistance, and the good autoregulation of the cerebral blood flow. These results can be partly explained by the new distribution of the blood volume caused by the disappearance of hydrostatic pressure and the strong reduction of physical work. No irreversible pathological modification was found during the flight. Ground simulation by antithrostatic bedrest shows that it is not possible to fully simulate the microgravity situation simply by -5 or -6 deg antithrostatic bedrest. N.B.

A83-48124

SPATIAL FREQUENCY TUNING OF ORIENTATION SELECTIVE UNITS ESTIMATED BY OBLIQUE MASKING

H. R. WILSON, D. K. MCFARLANE, and G. C. PHILLIPS (Chicago, University, Chicago, IL) Vision Research (ISSN 0042-6989), vol. 23, no. 9, 1983, p. 873-882. refs (Contract NSF BNS-81-13574)

Threshold elevations were measured as a function of the spatial frequency of high contrast cosine masks using spatially localized test stimuli with a 1.0 octave bandwidth. The cosine masks were oriented at 14.5 deg relative to the vertical test patterns in order to average out spatial phase effects. The experiment was repeated for each of 14 test frequencies spanning the range 0.25-22.0 c/deg in 0.5 octave steps. The resulting threshold elevation curves fell into a small number of distinct groups, suggesting the existence of discrete spatial frequency mechanisms in human central vision. The data are shown to be consistent with a model having just six distinct classes of spatial frequency mechanisms in the fovea. Spatial frequency bandwidth of these mechanisms ranged from 2.5 octaves at low frequencies to as narrow as 1.25 octaves at high spatial frequencies. These results require revision of the Wilson and Bergen (1979) model for spatial vision. Author

A83-48125

SLEEP AND THE MCCOLLOUGH EFFECT

N. J. LUND and D. M. MACKAY (Keele, University, Keele, Staffs., England) Vision Research (ISSN 0042-6989), vol. 23, no. 9, 1983, p. 903-906. Research supported by the Science and Engineering Research Council. refs

Orientation-contingent chromatic ('McCollough') aftereffects (OCCAs) were induced under carefully standardized conditions, in

subjects suffering from varying degrees of sleep deprivation. The initial OCCA strength was found to vary systematically with the prior sleep pattern of the subject. In subjects whose sleep normally lasted 7-8 hr, loss of 3 or 4 hr of the previous night's sleep could reduce initial strength by as much as 50 percent; no further reduction was observed with still shorter sleep durations. Keeping the eye in darkness while awake had in this respect no comparable effects to those of sleep, and sleeping in a lighted room made no difference. The results suggest that the McCollough Effect depends on a form of neural plasticity which requires a normal sleep cycle for its maintenance. Author

A83-48150

EMERGENCY CARE FOR BURNS [EKSTRENNIAA POMOSHCH' PRI OZHOGAKH]

R. I. MURAZIAN and N. R. PANCHENKOV Moscow, Izdatel'stvo Meditsina, 1983, 128 p. In Russian. refs

The basic principles and methods for rendering emergency treatment for patients with burns are examined in detail. The characteristics of the treatment of patients suffering from burn injuries are discussed for times both prior to and during hospitalization, including burns of the respiratory tract. Special attention is given to the specific treatment of patients with burn shock. A detailed evaluation is presented of infusion and transfusion methods for the treatment of burned patients, as well as the characteristics of their action. The basic indicators of infusion and transfusion treatments for burn shock and its complications are examined. The survival rate of patients with burns is considered, and various ways to improve the survival rate are addressed. N.B.

A83-48210

THE EFFECT OF A CONSTANT MAGNETIC FIELD AND GAMMA-RADIATION ON THE HEREDITARY STRUCTURE OF SOMATIC CELLS - THE EFFECT OF THE COMBINATION OF A CONSTANT MAGNETIC FIELD AND IONIZING RADIATION ON THE BLOOD LYMPHOCYTES OF HUMANS IN VITRO [VLIANIE POSTOIANNOGO MAGNITNOGO POLIA I GAMMA-RADIATSII NA NASLEDSTVENNUIU STRUKTURU SOMATICHESKIKH KLETOK - VOZDEISTVIE SOCHETANNIA POSTOIANNOGO MAGNITNOGO POLIA I IONIZIRUIUSHCHEI RADIATSII NA LIMFOTSITY KROVI CHELOVEKA IN VITRO]

M. S. MILEVA, B. A. IVANOV, M. D. BULANOVA, and T. P. PANTEV (Meditsinska Akademiia, Sofia, Bulgaria) Radiobiologiya (ISSN 0033-8192), vol. 23, July-Aug. 1983, p. 562-565. In Russian. refs

A83-48570

THE PREVENTION OF FLIGHT FATIGUE BY A METHOD OF PHYSICAL TRAINING [K PROFILAKTIKE LETNEGO UTOMLENIIA METODAMI FIZICHESKOI PODGOTOVKI]

M. T. LOBZHA Voenno-Meditsinskii Zhurnal (ISSN 0026-9050), July 1983, p. 52, 53. In Russian.

An experiment was conducted in order to determine whether physical training in the morning soon after awakening could be useful in preventing flight fatigue. One group (control) performed normal exercises each morning, while the other (experimental) group performed a special series of exercises each morning to prevent fatigue and was supervised by medical personnel. Results show that after 4 months of training, the experimental group exhibited a significantly better functional condition of the cardiovascular and respiratory systems than the control group. In addition, it was found that the lack of close medical supervision significantly reduced the effectiveness of this exercise program. N.B.

A83-48571

THE EFFECT OF THE MICROCLIMATE ON THE SLEEP AT NIGHT AND THE PHYSICAL WORKING CAPABILITY OF SAILORS DURING CRUISES AT LOW LATITUDES [VLIANIE MIKROKLIMATA NA NOCHNOI SON I FIZICHESKUII RABOTOSPOSOBNOST' MORIAKOV PRI PLAVANII V NIZKIKH SHIROTAKH]

G. N. NOVOZHILOV, V. V. PASTUKHOV, and N. N. PLAKHOV
Voenno-Meditsinskii Zhurnal (ISSN 0026-9050), July 1983, p. 54-56.
In Russian. refs

A83-48674

CIRCULATING ANTIBODIES TO AORTIC ELASTIN AND THEIR SIGNIFICANCE IN ATHEROSCLEROSIS IN HUMANS [TSIRKULIRUIUSHCHIE ANTITELA K ELASTINU AORTY I IKH ZNACHENIE PRI ATEROSKLEROZE U CHELOVEKA]

IU. V. IVANOVSKII (Akademiia Meditsinskikh Nauk SSSR, Moscow, USSR) and E. G. ZOTA (Kishinevskii Meditsinskii Institut, Kishinev, Moldavian SSR) Patologicheskaiia Fiziologii i Eksperimental'naia Terapiia (ISSN 0031-2991), July-Aug. 1983, p. 61-64. In Russian. refs

A83-48691#

COMPARATIVE CARDIOVASCULAR RESPONSES TO 70 HEAD UP TILT IN PILOTS AND NON-PILOTS

M. B. DIKSHIT (Indian Air Force, Institute of Aviation Medicine, Bangalore, India) Aviation Medicine, vol. 27, June 1983, p. 36-42. refs

Cardiovascular responses to 70 deg head up tilt were investigated in 29 pilots and 29 nonpilots who were classified either as old (average age = 29.9 + or - 2.6 years) or young (average age = 22.4 + or - 5.7 years). No differences were observed in the absolute values of heart rate and blood pressure in pilots and nonpilots. A new index, the orthostatic index, was developed which revealed significant differences in the orthostatic responses of pilots and nonpilots, especially in the older pilots and nonpilots. It was also found that inexperienced pilots (less than 100 hours of flying experience) exhibited greater cardiovascular strain than did experienced pilots (greater than 1000 hours of flying experience). The change in the heart rate and the orthostatic index values were found to be significantly different in the young and old groups. It is concluded that age and flying experience affect the cardiovascular response to head up tilt.

N.B.

A83-48692#

CHANGES IN THE URINARY LEVELS OF ELECTROLYTES, URIC ACID AND 17 OHCS WITH GRADED HEAT STRESS

E. M. IYER, P. K. BANERJEE, and S. SURYANARAYANA (Indian Air Force, Institute of Aviation Medicine, Bangalore, India) Aviation Medicine, vol. 27, June 1983, p. 43-47. refs

Eight healthy volunteers were exposed to 3 simulated thermal conditions of 40 C, 45 C and 50 C air temperature with relative humidity of 50 percent and wind velocity of 30 m/min. Duration of exposure in each set was one hour (or less when the subject reached his tolerance level). Exposure to thermoneutral condition of 25 C air temperature for one hour constituted the control run. Post exposure urinary samples were analysed for Na(+), K(+), Cl(-), uric acid and 17 OHCS and the values were expressed per 100 mg creatinine. While Na(+) and Cl(-) showed significant fall at 45 C and 50 C at the 0.05 confidence level, no such changes were observed with K(+). Uric acid showed significant reduction at 40 C at the 0.05 confidence level, and 45 C at the 0.01 confidence level, 17 OHCS showed significant fall only at 40 C at the 0.05 confidence level. However, at 50 C when the physiological strain reactions were very acute none of these urinary parameters showed any definite trend.

Author

A83-48877

CORRELATIONS BETWEEN EJECTION TIMES MEASURED FROM THE CAROTID PULSE CONTOUR AND THE IMPEDANCE CARDIOGRAM

M. A. B. FREY and B. M. DOERR (Wright State University, Dayton, OH) Aviation, Space and Environmental Medicine (ISSN 0095-0562), vol. 54, Oct. 1983, p. 894-897. refs

The correlation between left ventricular ejection time (LVET) determined from conventional systolic time interval (STI) analysis and a systolic ejection time (T) obtained with impedance cardiography was determined. The EKG, phonocardiogram, carotid pulse contour, and impedance cardiogram were recorded simultaneously in 17 male subjects 39-63 years of age (6 normotensive, 7 with established hypertension, and 4 with labile hypertension) while the subjects were at seated rest and during submaximal and maximal cycle ergometer exercise. Results of beat-by-beat analysis showed high intrasubject correlations between LVET and T for each subject during all three activity levels. These findings demonstrate that impedance cardiography can be employed in the determination of STIs for the evaluation of ventricular function, as well as for the noninvasive determination of stroke volume and cardiac output.

N.B.

A83-48878

NECK MUSCLE LOADING AND FATIGUE - SYSTEMATIC VARIATION OF HEADGEAR WEIGHT AND CENTER-OF-GRAVITY

C. A. PHILLIPS and J. S. PETROFSKY (Wright State University, Dayton, OH) Aviation, Space and Environmental Medicine (ISSN 0095-0562), vol. 54, Oct. 1983, p. 901-905. refs
(Contract DAMD17-80-C-0089)

The fatigue of neck muscles as measured by isometric endurance time was investigated. The experiments employed the dynamic and static loading of neck muscles by the systematic variation of 15 headgear configurations consisting of 5 different centers-of-gravity (forward-low, center-low, center-high, right-lateral-low, and afterward-low) and 3 different weights (3.2 lb, 5.0 lb, and 9.0 lb). Each subject rotated his head laterally (from side-to-side) for 30 min in each of the 15 headgear loading combinations. The subject then positioned his head in an isometric head dynamometer and exerted a sustained right lateral neck contraction at 70 percent of his maximum strength, during which the endurance time was monitored. The findings show that there were no significant differences in endurance time between the 3.2 lb/forward-low, 3.2 lb/lateral-right-low, and 9.0 lb/afterward-low compared to controls. All other head loading configurations were found to result in a significant reduction in endurance times as compared to controls.

N.B.

A83-48879

VISUAL TEST RESULTS COMPARED WITH FLYING PERFORMANCE IN TELEMETRY-TRACKED AIRCRAFT

R. KRUK and D. REGAN (Dalhousie University, Halifax, Canada) Aviation, Space and Environmental Medicine (ISSN 0095-0562), vol. 54, Oct. 1983, p. 906-911. refs
(Contract AF-AFOSR-78-3711)

Flying performance using high-performance, telemetry-tracked A4 and F-14 aircraft was compared with the results of laboratory and airborne visual tests. The index of performance in the low-level task was the bombing accuracy, while in air-to-air combat performance was evaluated by the number of missile hits scored per hit received (win/loss ratio). The laboratory tests included discrimination between two speeds of radically-expanding flow pattern and the manual tracking of a visual target. Airborne tests included the visual acquisition distance of an A4 aircraft and the visual sensitivity to a change in the course of an approaching A4 aircraft. It was found that the flow pattern and movement-in-depth tracking test results correlated with the bombing accuracy. The results of airborne visual tests were found to correlate with the win/loss ratio in combat, and tracking test results were found to correlate with the number of missiles fired per combat engagement.

N.B.

A83-48880**AGE-SPECIFIC MORBIDITY AMONG NAVY-PILOTS**

A. HOIBERG and C. BLOOD (U.S. Navy, Naval Health Research Center, San Diego, CA) Aviation, Space and Environmental Medicine (ISSN 0095-0562), vol. 54, Oct. 1983, p. 912-918. Navy-supported research. refs

The morbidity (hospitalization) rates by age of male Navy aviators ($n = 22,417$) were compared with the rates for three male control populations: nonpilot aircrew officers ($n = 9,483$), unrestricted line officers ($n = 55,593$), and staff officers ($n = 46,565$). Aircrew members and pilots were found to have the highest hospitalization rates of the four officer groups for both total admissions and for most of the 16 major diagnostic categories studied. Younger pilots were found to have the highest rates for the disorders of tooth development and eruption and accidental injuries (primarily sports-related), while one of the highest rates for older pilots was observed for circulatory diseases. It is concluded that the four officer populations are considerably healthier than civilian samples. N.B.

A83-49070

THE CHANGE IN CARDIAC ACTIVITY UNDER INCREASED PRESSURE ACCORDING TO DATA FROM VECTOR ANALYSIS [IZMENENIE SERDECHNOI DEIATEL'NOSTI POD POVYSHENNYM DAVLENIEM PO DANNYM VEKTOROMETRICHESKOGO ANALIZA]

V. G. SOROKIN Voenno-Meditsinskii Zhurnal (ISSN 0026-9050), Aug. 1983, p. 49. In Russian.

The mechanisms of the cardiac disorders evoked in individuals performing heavy physical work under an increased gas pressure up to 0.6 mPa are investigated. The EKG readings were studied using vector analysis for 10 healthy subjects 28-40 years of age who breathed an artificial nitrogen-oxygen gas mixture under these conditions. Changes in the bioelectric activity of the heart were observed as the pressure increased, which may reflect the initial reaction of the body to an increased partial pressure of oxygen. Toward the end of the period at increased pressure, the QRS vector increased, probably as a result of the very high amplitude of the R peak. It is concluded that EKG vector analysis can be employed to very accurately evaluate the character of disorders of cardiac activity during the breathing of an artificial gas mixture at increased pressures. N.B.

A83-49071

THE DIRECT ELECTRICAL STIMULATION OF THE UPPER URINARY TRACT IN CASE OF URETEROLITHS IN FLIGHT CREW PERSONNEL [PRIAMAIA ELEKTRICHESKAIA STIMULIATSIYA VERKHNIKH MOCHEVYKH PUTEI PRI KAMNIAKH MOCHETOCHNIKOV U LITS LETNOGO SOSTAVA]

A. R. GUSKOV Voenno-Meditsinskii Zhurnal (ISSN 0026-9050), Aug. 1983, p. 52-54. In Russian. refs

A83-49072

DISORDERS OF THE PERIPHERAL NERVOUS SYSTEM IN CONDITIONS OF A HOT, HUMID CLIMATE [ZABOLEVANIYA PERIFERICHESKOI NERVNOI SISTEMY V USLOVIAKH ZHARKOGO VLAZHNOGO KLIMATA]

L. D. DINKH, B. I. POPOV, F. V. KIEM, and D. CH. KII Voenno-Meditsinskii Zhurnal (ISSN 0026-9050), Aug. 1983, p. 61, 62. In Russian.

The clinical features and the course of peripheral nervous system disorders are examined for non-native individuals temporarily residing in the northern regions of the Socialist Republic of Vietnam. It is shown that, in conditions of a very hot and humid climate, diseases of the nerves and their roots occur relatively frequently, appearing in the form of vertebrogenic radicular syndromes. The incidence of diseases of the peripheral nervous system was examined in 69 patients 25-55 years of age. Of these patients, 33 exhibited the radicular syndrome of the thoracic vertebrae, 25 exhibited the radicular syndrome of the lumbosacral vertebrae, seven exhibited cervicobrachial plexitis, and four exhibited 'facial' diseases. The origin and development of each of these diseases is examined for this group of patients. Also

discussed are the preferred methods of treatment for these diseases. N.B.

A83-49547

THE DEPENDENCE OF THE FUNCTIONAL ACTIVITY OF THE HEART ON MENTAL ACTIVITY [FUNKSIONAL'NAIA AKTIVNOST' SERDTSA V ZAVISIMOSTI OT UMSTVENNOI DEIATEL'NOSTI]

L. V. KRUSHINSKII, L. M. KUZNETSOVA, O. O. IAKIMENKO, and N. P. POPOVA (Moskovskii Gosudarstvennyi Universitet; Moskovskii Gosudarstvennyi Pedagogicheskii Institut, Moscow, USSR) Akademiia Nauk SSSR, Doklady (ISSN 0002-3264), vol. 271, no. 5, 1983, p. 1268-1271. In Russian. refs

The characteristics of the working of the heart during the course of solving a mental task are investigated as part of a study to elucidate the factors responsible for solving mental tasks. The subjects were required to determine the vector and to extrapolate the direction and course of an object moving in space. The EKG characteristics and the dynamics of the heart rate were recorded for 130 subjects 20-30 years of age who were given this mental tasks. The subjects were twins of the same sex, with each set of twins serving either as experimental subjects or controls. Results show significant changes in the heart rate during the performance of the mental task, including differences in the variations of the heart rate, its pattern, arrhythmia, and the speed of the normalization following the mental task. These findings indicate that individual minds possess differing capabilities for logical thinking which results in differences in the functional reactions of the heart. N.B.

N83-34995# Joint Publications Research Service, Arlington, Va. EFFECTS OF WEIGHTLESSNESS ON COSMONAUTS

V. KOPANEV In its USSR Rept.: Space, No. 24 (JPRS-84161) p 59-61 22 Aug. 1983 Transl. into ENGLISH from Leningr. Pravda (Leningrad), 5 Mar. 1983 p 2
 Avail: NTIS HC A05

A general overview of the physiological effects of weightlessness on cosmonauts, including cardiovascular effects, bone demineralization, and 'motion sickness', is presented. In addition, preventive strategies are discussed. M.G.

N83-35607# Joint Publications Research Service, Arlington, Va. COMBINED, LOCAL AND CHEMICAL RADIOPROTECTION DURING SPACEFLIGHTS

V. I. YEFIMOV, S. K. KARSANOVA, and V. S. SHASHKOV In its USSR Rept.: Space Biol. and Aerospace Med., Vol. 17, No. 3, May - Jun. 1983 (JPRS-83828) p 1-6 6 Jul. 1983 refs Transl. into ENGLISH from Kosmich. Biol. i Aviakosmich. Med. (Moscow), v. 17, no. 3, May - Jun. 1983 p 4-8
 Avail: NTIS HC A08

The combined protection of dogs exposed to acute high energy proton irradiation at a dose of 400 rad was examined. The chemical radio-protector--mexamine--was injected intramuscularly at a dose of 10 mg/kg or administered per os at a dose of 75 mg/kg. During the exposure 14.5% of bone marrow was shielded. The dose behind the shielding was 250 rad. The combined use of mexamine administered per os and partial bone marrow shielding provided better protection, whereas either type of protection applied separately proved inefficient. Author

N83-35608# Joint Publications Research Service, Arlington, Va. SOLAR COSMIC RADIATION AND RADIATION HAZARD OF SPACEFLIGHTS

L. I. MIROSHNICHENKO In its USSR Rept.: Space Biol. and Aerospace Med., Vol. 17, No. 3, May - Jun. 1983 (JPRS-83828) p 7-14 6 Jul. 1983 refs Transl. into ENGLISH from Kosmich. Biol. i Aviakosmich. Med. (Moscow), v. 17, no. 3, May - Jun. 1983 p 8-13
 Avail: NTIS HC A08

Present-day data on the spectrum of solar radiation in the source and near the Earth are discussed as applied to the radiation safety of crewmembers and electronics onboard manned and unmanned spacecraft. It is shown that the slope of the solar radiation spectrum changes (flattens) in the low energy range.

Quantitative information about absolute solar radiation fluxes near the Earth is summarized in relation to the most significant flares of 1956 to 1978. The time-related evolution of the solar radiation spectrum in the interplanetary space is described in quantitative terms (as illustrated by the solar flare of 28 September 1961). It is indicated that the nonmonotonic energy dependence of the transport path of solar radiation in the interplanetary space should be taken into consideration. It is demonstrated that the diffusion model of propagation can be verified using solar radiation measurements in spaceflight. Author

N83-35611# Joint Publications Research Service, Arlington, Va.
SOME DISTINCTIONS REFERABLE TO AMINO ACID LEVELS IN BLOOD OF COSMONAUTS WHO PARTICIPATED IN 185-DAY FLIGHT

I. G. POPOV and A. A. LATSKEVICH *In its* USSR Rept.: Space Biol. and Aerospace Med., Vol. 17, No. 3, May - Jun. 1983 (JPRS-83828) p 30-37 6 Jul. 1983 refs Transl. into ENGLISH from Kosmich. Biol. i Aviakosmich. Med. (Moscow), v. 17, no. 3, May - Jun. 1983 p 23-29
 Avail: NTIS HC A08

Data on the content of 17 free amino acids in plasma of the crewmembers before and after the Salyut-6 185-day flight are presented. Measurements were performed by an automatic amino acid analyzer. Postflight the content of most amino acids was lower than preflight. It is concluded that, in order to increase the amino acid supply, preflight diets should be supplemented with all amino acids, particularly, methionine, threonine, isoleucine, cystine, arginine, alanine, histidine, and postflight diets with all amino acids. Author

N83-35614# Joint Publications Research Service, Arlington, Va.
GENERAL PATTERNS OF BONE ATROPHY IN THE ABSENCE OF LOAD ON SKELETON

G. P. STUPAKOV, V. S. KAZEYKIN, and A. I. VOLOZHIN *In its* USSR Rept.: Space Biol. and Aerospace Med., Vol. 17, No. 3, May - Jun. 1983 (JPRS-83828) p 48-59 6 Jul. 1983 refs Transl. into ENGLISH from Kosmich. Biol. i Aviakosmich. Med. (Moscow), v. 17, no. 3, May - Jun. 1983 p 36-45
 Avail: NTIS HC A08

The rate of atrophic changes in spongy bones of the weightless man was estimated, using studies of human, dog and rat bones, as well as observations of neurological patients bed-stricken for a long time. Two models were built taking into consideration data in the literature on the bone status and mineral balance in real and simulated space flights. The models make it possible to estimate osteoporosis of spongy bones of the axial skeleton in the absence of weight loading. One of the models, an intraspecies model for the human population, is based on the experimentally found rate of the physiological rearrangement of various spongy bones. The other, interspecies, model is built with reference to the parameters determining the rate, i.e., bone density and metabolism. The average monthly rates of axial bone losses calculated by means of the two independent methods are essentially identical. The data obtained allow prediction of the decrease of tolerance to head-to-feet impact acceleration as a function of flight duration. Author

N83-35615# Joint Publications Research Service, Arlington, Va.
HEMODYNAMIC DISTINCTIONS RELATED TO DIFFERENT MODELS OF EXPERIMENTAL HYPOKINESIA

O. P. DOBROMYSLOVA, L. A. POKROVSKAYA, and S. A. LEVSKIN *In its* USSR Rept.: Space Biol. and Aerospace Med., Vol. 17, No. 3, May - Jun. 1983 (JPRS-83828) p 60-64 6 Jul. 1983 refs Transl. into ENGLISH from Kosmich. Biol. i Aviakosmich. Med. (Moscow), v. 17, no. 3, May - Jun. 1983 p 45-48
 Avail: NTIS HC A08

The effect of hypokinesia on systemic hemodynamics was investigated in rat and rabbit experiments using dispersion analysis. It is shown that different models of hypokinesia produce hemodynamic disorders which depend on the type and duration of hypokinesia and animal responses to them. In rats the exposure

to hypokinesia causes the hypertensive symptom-complex while in rabbits hypotensive symptom-complex while in rabbits hypotensive disorders. The application of the dispersion analysis allows quantitative estimation of the hypokinetic effect on demonstrative indexes and detection of the most vulnerable parameter. Author

N83-35616# Joint Publications Research Service, Arlington, Va.
STRUCTURAL AND FUNCTIONAL CHANGES IN HUMAN ERYTHROCYTES AND LEUKOCYTES RELATED TO SEVEN-DAY IMMERSION HYPOKINESIA

G. I. KOZINETTS, M. S. BELAKOVSKIY, A. S. USHAKOV, I. A. BYKOVA, V. P. MATVEYENKO, S. M. DULTSINA, O. A. DYAGILEVA, V. V. KASATKINA, I. V. RYAPOLOVA, and V. M. POGORELOV *In its* USSR Rept.: Space Biol. and Aerospace Med., Vol. 17, No. 3, May - Jun. 1983 (JPRS-83828) p 65-70 6 Jul. 1983 refs Transl. into ENGLISH from Kosmich. Biol. i Aviakosmich. Med. (Moscow), v. 17, no. 3, May - Jun. 1983 p 48-51
 Avail: NTIS HC A08

Changes in blood parameters (red and white blood cell counts) were examined in 6 healthy male volunteers during an acute stage of adaptation to the exposure simulating physiological effects of weightlessness. The parameters varied, remaining, however, within the physiological limits. Author

N83-35617# Joint Publications Research Service, Arlington, Va.
INVESTIGATION OF CORONARY CIRCULATION OF PILOTS DURING FLIGHTS

V. S. BEDNENKO, A. B. VASILYEV, A. N. KOZLOV, and V. Y. KOLYAGIN *In its* USSR Rept.: Space Biol. and Aerospace Med., Vol. 17, No. 3, May - Jun. 1983 (JPRS-83828) p 71-76 6 Jul. 1983 refs Transl. into ENGLISH from Kosmich. Biol. i Aviakosmich. Med. (Moscow), v. 17, no. 3, May - Jun. 1983 p 51-54
 Avail: NTIS HC A08

Coronary circulation was examined in pilots of transport aircraft during 14 flights by Doppler cardiography (with respect to changes in the integrated level of the reflected signal in systole). At certain flight stages the coronary circulation efficiency varied substantially. It is concluded that coronary circulation should be monitored during pilot training and aircraft testing in order to standardize flight loads. Author

N83-35618# Joint Publications Research Service, Arlington, Va.
DIAGNOSING FATIGUE IN FLIGHT PERSONNEL ACCORDING TO CARDIODYNAMIC DATA

V. S. BEDNENKO, G. N. GRECHIKHIN, A. N. KOZLOV, and A. A. KRIVONOS *In its* USSR Rept.: Space Biol. and Aerospace Med., Vol. 17, No. 3, May - Jun. 1983 (JPRS-83828) p 77-81 6 Jul. 1983 refs Transl. into ENGLISH from Kosmich. Biol. i Aviakosmich. Med. (Moscow), v. 17, no. 3, May - Jun. 1983 p 55-58
 Avail: NTIS HC A08

By Doppler cardiography systolic and diastolic time intervals and cardiac contractility were measured in 22 pilots during interflight periods. Certain cardiodynamic parameters showed significant differences in the pilots as compared to 24 nonpilots. It is indicated that these parameters should be regularly monitored between flights in order to prevent fatigue of the flight personnel, to detect early development of cardiac insufficiency, and to maintain pilot longevity. Author

N83-35619# Joint Publications Research Service, Arlington, Va.
EFFECT OF TRANQUILIZERS ON MOTIVATION ELEMENTS AND TACTICS OF OPERATOR PERFORMANCE

G. D. GLOD, I. S. MOROZOV, S. I. SYTNIK, V. I. MOROSANOVA, and Y. R. IVANOV *In its USSR Rept.: Space Biol. and Aerospace Med.*, Vol. 17, No. 3, May - Jun. 1983 (JPRS-83828) p 82-88 6 Jul. 1983 refs Transl. into ENGLISH from Kosmich. Biol. i Aviakosmich. Med. (Moscow), v. 17, no. 3, May - Jun. 1983 p 58-62

Avail: NTIS HC A08

The effect of tranquilizers on the motivation components and tactics of operator's activities was investigated, using a model of discrete tracking of a moving object. The correlation-matrix method was applied to determine the region of no error correction. It was shown that specific changes in the tactics of operator's activities developing in response to tranquilizers and reduced motivation were identical. It appears probable that decreased motivation of failure avoidance forms the phenomenon of preparedness of risk taking and optimization of operator's activities when tranquilizers are used under psychological conflict conditions. Author

N83-35621# Joint Publications Research Service, Arlington, Va.
ESTIMATES OF COSMIC RADIATION DOSES IN NEAR-EARTH ORBITS WITH APOGEE UP TO 1000 KM DURING PERIOD OF SOLAR INACTIVITY

L. N. SMIRENNYY and A. V. KHORTSEV *In its USSR Rept.: Space Biol. and Aerospace Med.*, Vol. 17, No. 3, May - Jun. 1983 (JPRS-83828) p 94-97 6 Jul. 1983 refs Transl. into ENGLISH from Kosmich. Biol. i Aviakosmich. Med. (Moscow), v. 17, no. 3, May - Jun. 1983 p 66-67

Avail: NTIS HC A08

Radiation hazards of orbital flights at altitudes of 200 to 1000 km are estimated. The proposed method estimates cosmic radiation dosages when the Sun is inactive. The method is based on experimental data obtained by Earth satellites and measurements of cosmic radiation attenuation by shielding materials. Radiation dosages for circular and elliptical orbits under shielding thicknesses of 1 to 10 g/sq cm are calculated. There is satisfactory agreement between estimated and experimental data. J.M.S.

N83-35622# Joint Publications Research Service, Arlington, Va.
EXPEDIENCY OF USING PERSONAL DOSIMETERS FOR EFFECTIVE DOSES DURING MANNED SPACEFLIGHTS

I. V. BOCHVAR, T. I. GIMADOVA, and I. B. KEIRIM-MARKUS *In its USSR Rept.: Space Biol. and Aerospace Med.*, Vol. 17, No. 3, May - Jun. 1983 (JPRS-83828) p 98-105 6 Jul. 1983 refs Transl. into ENGLISH from Kosmich. Biol. i Aviakosmich. Med. (Moscow), v. 17, no. 3, May - Jun. 1983 p 68-69

Avail: NTIS HC A08

The use of personal dosimeters for each crew member during interplanetary spaceflight is considered. Personal dosimeters provide measurements for each crew member during movement in the spacecraft, their extravehicular activity, conditions of servicing the nuclear power plants, etc. The results of estimating effective dose as determined from readings of different dosimeters are compared. J.M.S.

N83-35624# Joint Publications Research Service, Arlington, Va.
SIMULATION OF SPACE FORM OF MOTION SICKNESS

R. R. GALLE, A. R. KOTOVSKAYA, G. A. GUSAKOVA, L. N. GAVRILOVA, N. N. GALLE, and E. A. SKIBA *In its USSR Rept.: Space Biol. and Aerospace Med.*, Vol. 17, No. 3, May - Jun. 1983 (JPRS-83828) p 110-117 6 Jul. 1983 refs Transl. into ENGLISH from Kosmich. Biol. i Aviakosmich. Med. (Moscow), v. 17, no. 3, May - Jun. 1983 p 74-78

Avail: NTIS HC A08

A method of experimental reproduction of motion sickness was developed. The method includes 5-h rotation during which the subjects are able to perform active movements and displacements. Standardization of vestibular stimuli is obtained by performing active head movements in different directions, which are graded in amplitude and number, during each hour of rotation. In subjects with a predisposition for motion sickness, marked signs of this

sickness developed during rotation at 6 r/min. The rate of rotation can be increased for subjects with greater resistance to vestibular stimuli. With repeated rotation sessions at 2 week intervals, there was virtually no change in severity of the motion sickness syndrome, and this is important to assess the efficacy of agents against motion sickness. The similarity of the developed model to the space motion sickness makes it effective in studies dealing with a search for reliable agents for prevention of vestibular dysfunctions during space flights. J.M.S.

N83-35626# Joint Publications Research Service, Arlington, Va.
MODIFIED REBREATHING METHOD FOR DETERMINATION OF CARDIAC OUTPUT WITH INCREASING EXERCISE LOADS

V. I. GAVRILENKOV, V. V. GRITSENKO, and O. Y. MOCHALOV *In its USSR Rept.: Space Biol. and Aerospace Med.*, Vol. 17, No. 3, May - Jun. 1983 (JPRS-83828) p 123-130 6 Jul. 1983 refs Transl. into ENGLISH from Kosmich. Biol. i Aviakosmich. Med. (Moscow), v. 17, no. 3, May - Jun. 1983 p 81-83

Avail: NTIS HC A08

In order to obtain the true values of carbon dioxide tension in mixed venous blood ($p_{sub v} CO_2$) during exercise of increasing intensity from 25 W to its limit, one should use a gas mixture with somewhat higher CO_2 content than the predicted $p_{sub v} CO_2$ for a specific exercise load, as well as a volume of gas mixture that would be sufficient for free use of rebreathing (RB). Proper individual selection of volume and composition of the gas mixture assures optimum conditions for rapid equilibration of carbon dioxide tension of respiratory air (pCO_2) and $p_{sub v} CO_2$ during RB in the course of intensive exercise within a short blood recirculation time. Since the RB system is connected after complete expiration and the respiratory volume at maximum exercise loads constitutes 2/3 of vital lung capacity, it was suggested to use a volume of gas mixture in the breathing bag equalized to the subjects' vital capacity. In order to determine the composition of gas mixture, in which pCO_2 somewhat exceeds $p_{sub v} CO_2$ with a specifically increasing load, a method of selecting a gas mixture of the proper CO_2 content is proposed. Author

N83-35627# Joint Publications Research Service, Arlington, Va.
MORPHOLOGICAL COMPOSITION OF HUMAN BLOOD AND CYTOCHEMICAL REACTIONS OF LEUKOCYTES AS RELATED TO LONG-TERM EXPOSURE TO LOW CONCENTRATIONS OF AMMONIA

M. P. KALANDAROVA *In its USSR Rept.: Space Biol. and Aerospace Med.*, Vol. 17, No. 3, May - Jun. 1983 (JPRS-83828) p 131-133 6 Jul. 1983 refs Transl. into ENGLISH from Kosmich. Biol. i Aviakosmich. Med. (Moscow), v. 17, no. 3, May - Jun. 1983 p 85-86

Avail: NTIS HC A08

Studies were conducted on 8 subjects who stayed in a pressure chamber with ammonia in air for 12 days. Erythrocyte count, hemoglobin, reticulocytes, thrombocytes, leukocytes and their different forms (on the hemogram) were determined. Cytochemical reactions in leukocytes were assessed by the Kaplow method which is based on quantitative assay of stained substance in the cell. The quantity of positively reacting cells (percentage) were determined, as well as mean cytochemical coefficient. Results are applicable to validate the maximum permissible concentrations for long term continuous exposure to low levels of ammonia in the atmosphere of pressurized compartments, combined with other deleterious ambient factors, such as high temperature and humidity. J.M.S.

N83-35628# Joint Publications Research Service, Arlington, Va.
BILATERAL GALVANIZATION OF LABYRINTHS USED TO SIMULATE CHANGES IN VESTIBULAR AFFERENTATION IN WEIGHTLESSNESS

Y. B. SHULZHENKO, G. I. GORGILADZE, and V. G. KOZLOVA
In its USSR Rept.: Space Biol. and Aerospace Med., Vol. 17, No. 3, May - Jun. 1983 (JPRS-83828) p 134-138 6 Jul. 1983
 refs Transl. into ENGLISH from Kosmich. Biol. i Aviakosmich. Med. (Moscow), v. 17, no. 3, May - Jun. 1983 p 86-88
 Avail: NTIS HC A08

A method of simulating changes in vestibular function similar to reactions resulting from spaceflight conditions is described. The method is based on bilateral galvanization of the labyrinths. It is established that passing direct current of a specific direction through the labyrinths produces consistent changes in impulsion afferent activity of the vestibular nerve and neurons of vestibular nuclei. There is depression and even complete elimination of vestibular function. J.M.S.

N83-35632 Pittsburgh Univ., Pa.
EFFECT OF BICARBONATE AND GLUCOSE INGESTION DURING PROLONGED CYCLE ERGOMETER EXERCISE Ph.D. Thesis

J. E. FALKEL 1982 194 p
 Avail: Univ. Microfilms Order No. DA8303613

The effect of the ingestion of sodium bicarbonate and/or glucose on maximal work capacity and blood buffering during prolonged cycle ergometer exercise are examined. Six highly trained competitive cyclists were used as subjects. Each subject completed four cycle ergometer trials at a workload equivalent to 75% VO₂ max. One of the following substances was taken orally during each trial: (1) NaHCO₃ (0.3g/kg body weight); (2) glucose (20 g of dextrose); (3) combined NaHCO₃ and glucose; (4) a placebo (CaCO₃). Thirty minutes before the exercise, the subject ingested 25% of that day's experimental compound along with 200 ml of water. Immediately prior to the exercise, and every 10 minutes during the first hour of exercise, 10% of the experimental compound was taken with 100 ml of water. After the first 60 minutes of exercise, the NaHCO₃ and/or glucose supplementation was stopped. Every 10 minutes thereafter, an additional 100 ml of water was consumed. Subjects continued the exercise until they could no longer maintain the pedal frequency of 90 rev/min. Oxygen consumption, heart rate, blood pressure, and blood samples were collected at rest, pre-exercise, and every 10 minutes through the final minute of exercise. Dissert. Abstr.

N83-35633* National Aeronautics and Space Administration, Washington, D. C.
AEROSPACE MEDICINE AND BIOLOGY: A CONTINUING BIBLIOGRAPHY (SUPPLEMENT 249)

Sep. 1983 87 p
 (NASA-SP-7011(249); NAS 1.21:7011(249)) Avail: NTIS HC \$7.00 CSCL 06E

This bibliography lists 311 reports, articles and other documents introduced into the NASA scientific and technical information system in August 1983. Author

N83-35634# Naval Health Research Center, San Diego, Calif.
AGE-SPECIFIC MORBIDITY AMONG NAVAL AVIATORS Interim Report

A. HOLBERG and C. BLOOD Jan. 1983 18 p refs
 (Contract MF5852801A)
 (AD-A127749; NAVHLTHRSCHC-82-31) Avail: NTIS HC A02/MF A01 CSCL 06E

This study compares the morbidity (hospitalization) rates by age of male Navy pilots (n = 22,417) with rates for three male control populations: nonpilot aircrew officers (n = 9,483), unrestricted line officers (n = 55,593), and staff officers (n = 46,565). Aircrew members and pilots have the highest hospitalization rates of four officer groups for both total admissions and for most of the 16 major diagnostic categories. Younger pilots have the highest rates for disorders of tooth development and eruption and accidental injuries (primarily sports related) while one

of the highest rates for older pilots is observed for circulatory diseases. In comparisons with civilian samples, the four officer populations are considerably healthier. To further protect the health of Navy personnel, a health risk profile should be developed, implemented, and used as the initial step in reducing and eliminating health risk factors. GRA

N83-35635# Yugoslav Academy of Sciences and Arts, Zagreb.
 Dept. of Psychophysiology of Work.

HEALTH AND SAFETY IMPLICATIONS OF DIURNAL VARIABILITY IN TOLERANCE TO STRESS Final Report

S. VIDACEK Dec. 1981 227 p refs Sponsored in part by NIOSH
 (PB83-195933) Avail: NTIS HC A11/MF A01 CSCL 06J

The productivity of women workers was studied in a company manufacturing electronic equipment. The workers worked in three weekly rotated shifts, covering a 24 hour period; the morning shift (06:00 - 14:00), the afternoon shift (14:00 - 22:00) and the night shift (22:00 - 06:00). The afternoon shift's productivity was relatively highest (102.1%) and that of the night shift lowest (97.2%). The greatest difference in shifts' productivity were noticeable on the first two days of the week when the night shift was least productive; later in the week there were no significant differences in shifts' productivity. The work output of the relatively most productive workers in the night shift increased during work in the night shift faster over the week than of the least productive ones. Author (GRA)

N83-35636# Applied Physics Lab., Johns Hopkins Univ., Laurel, Md. Office of Power Plant Site Evaluation.

HUMAN REACTIONS TO TRANSIENT ELECTRIC CURRENTS Annual Report, Jul. 1981 - Jul. 1982

J. P. REILLY, W. LARKIN (Maryland Univ.), R. J. TAYLOR, and V. T. FREEMAN Jul. 1982 193 p refs Sponsored in part by Maryland Dept. of Natural Resources and Canadian Electrical Assoc.

(Contract N00024-81-C-5301)
 (PB83-204628; JHU/APL/CPE-8203) Avail: NTIS HC A09/MF A01 CSCL 06T

The report presents research results on the psychophysical reactions as well as the electrical properties of human subjects in response to electrical stimuli from high voltage capacitive discharges. The electrical stimuli are characterized by high voltages (up to several thousands of volts), high peak currents (several hundred mA), high current densities (up to 1000 A/sq.cm.), and brief durations (from below 1 microsecond to about 1ms). Threshold and suprathreshold psychophysical reactions to single transient stimuli are analyzed. The subjects' electrical properties in response to these stimuli are also presented. Psychophysical measurements are related to electrical parameters with consideration of some basic properties of excitable membranes. Author (GRA)

N83-36624# Joint Publications Research Service, Arlington, Va.
ADVICE ON PROLONGING FLYING CAREERS

N. RUDNYY *In its USSR Rept.: Life Sci. Biomed. and Behavioral Sci.*, No. 41 (JPRS-84296) p 1-5 12 Sep. 1983 Transl. into ENGLISH from Aviatsiya i Kosmonavtika (Moscow), no. 5, 1983 p 40-41

Avail: NTIS HC A05

The long term effects of physical exercise on combat training and flight training were discussed. The use of alcohol and smoking and their effects on the psychophysiological reliability of pilots was also examined. B.G.

N83-36626# Joint Publications Research Service, Arlington, Va.
AN EXPERT'S OPINION ABOUT FUTURE SPACEFLIGHTS

O. G. GAZENKO *In its USSR Rept.: Life Sci. Biomed. and Behavioral Sci.*, No. 44 (JPRS-84505) p 1-2 11 Oct. 1983 Transl. into ENGLISH from Sov. Rossiya (Moscow), 8 Apr. 1983 p 4

Avail: NTIS HC A05

The influence of spaceflight conditions on man, animals and plants was studied. In the event of their adverse effects a search

was made for means of controlling them, for example, the body's reactions to weightlessness. In general, the impression is gained that man can adapt satisfactorily to long term exposure to space. Positive results with respect to providing favorable living conditions aboard a spacecraft for man and animals was achieved. Space medicine doesn't have extraterrestrial applications. The numerous methods and instruments, which were developed to train cosmonauts and used in orbit are now well-used on Earth. Space experiments also have a substantial influence on development of theories about the origin and evolution of life on Earth. Author

N83-36629# Joint Publications Research Service, Arlington, Va. **EQUALIZATION OF URBAN AND RURAL MEDICAL SERVICES DISCUSSION**

P. PETROV and G. POPOV *In its USSR Rept.: Life Sci. Biomed. and Behavioral Sci.*, No. 44 (JPRS-84505) p 59-65 11 Oct. 1983 refs Transl. into ENGLISH from Nar. Khoz. Kazakhstan (Alma Ata), no. 5, May 1983
 Avail: NTIS HC A05

The system of medical aid to the rural population in the USSR is based on the principle of stages (stage I -- rural medical clinics, uchastok hospitals, feldscher-midwife centers; stage II -- rayon establishments; stage III -- city, oblast and republic establishment). At each subsequent stage, patients receive more skillful and specialized medical assistance than at the preceding one. With respect to content, significance and volume, outpatient polyclinic service occupies an exceptionally important place. It is a mass form of the organization of medical services. One of the leading organizational principles is the uchastok principle. The needs of public health services are satisfied best, achievement of integrated solutions of medical, ecological, sociohygienic problems of disease and traumatism prevention, sanitation of the environment, improvement of working, living and relaxation conditions are made possible, and a conscientious attitude in the Soviet people is developed toward their health. Author

N83-36637# Joint Publications Research Service, Arlington, Va. **SOME DISTINCTIONS OF MEDICAL SUPPORT OF AVIATION AND SPACE MISSIONS**

N. M. RUDNYY and I. D. PESTOV *In its USSR Rept.: Space Biol. and Aerospace Med.*, Vol. 17, No. 4, Jul. - Aug. 1983 (JPRS-84412) p 1-8 27 Sep. 1983 refs Transl. into ENGLISH from Kosmich. Biol. i Aviakosmich. Med. (Moscow), v. 17, no. 4, Jul. - Aug. 1983 p 4-9
 Avail: NTIS HC A08

The specific features of the environment and human activities in aviation and space flights which distinguish the major relations in the system man vehicle environment as related to their medical support were compared. It is shown that in the aviation flight the man vehicle interaction plays the leading role while in the space flight the man environment interaction is more important. These differences are considered and medical and professional selection, prediction, medical monitoring and medical support of pilots and cosmonauts is discussed. E.A.K.

N83-36638# Joint Publications Research Service, Arlington, Va. **PRINCIPLES OF ORGANIZATION OF RATIONAL SCHEDULES FOR CREW WORK AND REST DURING A LONG-TERM SPACEFLIGHT**

A. N. LITSOV and V. I. BULYKO *In its USSR Rept.: Space Biol. and Aerospace Med.*, Vol. 17, No. 4, Jul. - Aug. 1983 (JPRS-84412) p 9-13 27 Sep. 1983 refs Transl. into ENGLISH from Kosmich. Biol. i Aviakosmich. Med. (Moscow), v. 17, no. 4, Jul. - Aug. 1983 p 9-12
 Avail: NTIS HC A08

The work rest cycles of Salyut-6 crews were investigated. Several modifications were detected: 24 hour static regimens (65-70%) and altered regimens 35-30% with longer or shorter work rest cycles. It is found that in prolonged space flights two regimens are allowed: principal regimens which are normal static regimes of work and rest used throughout the flight, and operational regimens which differ from 24 hour ones and are used no more than once every 7-10 days. E.A.K.

N83-36639# Joint Publications Research Service, Arlington, Va. **OPTOKINETIC NYSTAGMUS AND OPTOKINETIC STABILITY OF COSMONAUTS IN PREFLIGHT AND POSTFLIGHT PERIODS**

L. N. KORNILOVA, Y. V. KREYDICH, I. K. TARASOV, and I. Y. YAKOVLEVA *In its USSR Rept.: Space Biol. and Aerospace Med.*, Vol. 17, No. 4, Jul. - Aug. 1983 (JPRS-84412) p 14-19 27 Sep. 1983 refs Transl. into ENGLISH from Kosmich. Biol. i Aviakosmich. Med. (Moscow), v. 17, no. 4, Jul. - Aug. 1983 p 12-15

Avail: NTIS HC A08

The influence of space flight factors on optomotor reactions and optokinetic resistance of 17 cosmonauts after prolonged and short-term flights is discussed. It is found that flight factors affect the nature of optomotor reactions and that there is a relationship between these reactions and initial resistance to optokinetic stimuli. The changes are functional and transient. The assessment of individual endurance of optokinetic factors, and the determination of the distinctions of optokinetic nystagmus in response to the delivered stimuli and in conjunction with the set of tests of vestibular function in cosmonauts is recommended. E.A.K.

N83-36640# Joint Publications Research Service, Arlington, Va. **EFFECT OF HYPOKINESIA IN ANTIORTHOSTATIC POSITION ON PULMONARY CIRCULATION AND GAS EXCHANGE**

V. Y. VOROBYEV, V. R. ABDRAKHMANOV, I. V. KOVACHEVICH, A. P. GOLIKOV, L. L. STAZHADZE, V. V. BOGOMOLOV, S. G. VORONINA, and L. G. REPENKOVA *In its USSR Rept.: Space Biol. and Aerospace Med.*, Vol. 17, No. 4, Jul. - Aug. 1983 (JPRS-84412) p 20-24 27 Sep. 1983 refs Transl. into ENGLISH from Kosmich. Biol. i Aviakosmich. Med. (Moscow), v. 17, no. 4, Jul. - Aug. 1983 p 16-18

Avail: NTIS HC A08

Gas exchange and lung perfusion during 14 day head down tilt and immediately thereafter were investigated. Zonal rheography of the lungs and ECG's showed an increase during head down tilting in pulmonary circulation. A significant decrease in O₂ tension and slight increase in CO₂ tension of the arterial blood was detected. Immediately post test pulmonary circulation declined and metabolic acidosis developed simultaneously. Drugs reducing pulmonary hypertension are recommended for emergency medical aid in space flight. E.A.K.

N83-36641# Joint Publications Research Service, Arlington, Va. **CONTRAST TEMPERATURES IN SAUNA AS A MEANS OF ENHANCING MAN'S ORTHOSTATIC STABILITY**

V. I. SOBOLEVSKIY *In its USSR Rept.: Space Biol. and Aerospace Med.*, Vol. 17, No. 4, Jul. - Aug. 1983 (JPRS-84412) p 25-28 27 Sep. 1983 refs Transl. into ENGLISH from Kosmich. Biol. i Aviakosmich. Med. (Moscow), v. 17, no. 4, Jul. - Aug. 1983 p 19-21

Avail: NTIS HC A08

Contrasting thermal effects in the sauna bath which help increase orthostatic tolerance were examined. It is considered that increase on tolerance may cause a lower increase of heart rate, an increase in pulse pressure and a smaller change in ECG and PCG in the standing position. The use of contrast thermal effects in the sauna bath to maintain and improve man's orthostatic tolerance is recommended. E.A.K.

N83-36642# Joint Publications Research Service, Arlington, Va. **EFFECT OF SEVEN DAYS WITHOUT GRAVITY LOAD ON VELOCITY AND STRENGTH OF HUMAN SKELETAL MUSCLES**

L. S. GRIGORYEVA and I. B. KOZLOVSKAYA *In its USSR Rept.: Space Biol. and Aerospace Med.*, Vol. 17, No. 4, Jul. - Aug. 1983 (JPRS-84412) p 29-35 27 Sep. 1983 refs Transl. into ENGLISH from Kosmich. Biol. i Aviakosmich. Med. (Moscow), v. 17, no. 4, Jul. - Aug. 1983 p 21-25

Avail: NTIS HC A08

The effect of 7 day water immersion on the velocity strength properties of the triceps and anterior tibial muscles was investigated. The exposure decrease the maximum strength of the leg extensors which seen in a large velocity range and during static movements. The decline of the contractile properties of the

extensors is also manifested in a increase of the ratio of bioelectrical and mechanical effects of contraction which is pronounced during high load and isometric regimens. The strength properties of the tibial muscle diminished only during isometric contractions. The high rate with which the above changes developed and returned to normal after the exposure indicate a reflex nature and association with mechanisms of tonic disorders which are due to the lack of support loading. E.A.K.

N83-36648# Joint Publications Research Service, Arlington, Va. **INFLUENCE OF ADDITION OF NITROGEN TO INHALED OXYGEN ON EFFICACY OF TWO-HOUR DENITROGENATION BEFORE DECOMPRESSION FROM 760 TO 220 MM HG**

A. S. BARER, M. I. VAKAR, G. F. VOROBYEV, L. R. ISEYEV, S. N. FILIPENKOV, and V. I. CHADOV *In its USSR Rept.: Space Biol. and Aerospace Med.*, Vol. 17, No. 4, Jul. - Aug. 1983 (JPRS-84412) p 66-69 27 Sep. 1983 refs Transl. into ENGLISH from Kosmich. Biol. i Aviakosmich. Med. (Moscow), v. 17, no. 4, Jul. - Aug. 1983 p 45-47
 Avail: NTIS HC A08

The ground-based experimental study of denitrogenation by oxygen breathing showed that two-hour denitrogenation was inadequate if the breathing gas contained about 10% nitrogen or if the process included 3-10 min of air breathing. The reduction of the nitrogen content in the breathing gas to 0.4-5% eliminated severe forms of the decompression disease and decreased significantly the incidence of its mild forms to 3.2%. This allowed work of moderate load at the ambient pressure 220 mm Hg after two-hour breathing of oxygen with nitrogen admixture of no more than 5%.
 Author

N83-36654# Joint Publications Research Service, Arlington, Va. **EFFECT OF WORKING IN SHIFTS ON CIRCADIAN PATTERN OF BODY TEMPERATURE**

A. I. SHCHUKIN *In its USSR Rept.: Space Biol. and Aerospace Med.*, Vol. 17, No. 4, Jul. - Aug. 1983 (JPRS-84412) p 107-112 27 Sep. 1983 refs Transl. into ENGLISH from Kosmich. Biol. i Aviakosmich. Med. (Moscow), v. 17, no. 4, Jul. - Aug. 1983 p 72-75
 Avail: NTIS HC A08

Two groups of building and manufacturing workers - men of 19-20 years old with a work record of 1 year - were examined. The test subjects of the first group (10 subjects) worked throughout the year during the morning shift only, and the test subjects of the second group (5 subjects) during two shifts (one week - morning shift, another - evening shift). The test subjects were examined as follows: 1st group subjects once, and 2nd group subjects twice - the first time after one week of the morning shift and the second time after one week of evening shift. Diurnal variations in the rectal, sublingual and axillary temperatures were recorded continuously. During the two-shift work the shape of diurnal curves of body temperatures depended on the preceding shift; therefore, they showed rises at certain working hours. Unlike the one-shift work, the two-shift work was characterized by a change in the daily temperature minima to the right by 2-4 h. The amplitude and phase changes are viewed as a result of the stressogenic effect of the shift work.
 B.W.

N83-36656# Joint Publications Research Service, Arlington, Va. **ADSORPTIVITY OF SULFUR-CONTAINING RADIOPROTECTIVE AGENTS**

V. N. SERYAKOV and V. N. SHVETS *In its USSR Rept.: Space Biol. and Aerospace Med.*, Vol. 17, No. 4, Jul. - Aug. 1983 (JPRS-84412) p 118-122 27 Sep. 1983 refs Transl. into ENGLISH from Kosmich. Biol. i Aviakosmich. Med. (Moscow), v. 17, no. 4, Jul. - Aug. 1983 p 78-80
 Avail: NTIS HC A08

At the present time, radioprotective agents have gained wide use in the study of the body's reactivity during spaceflights. The distribution, recording and evaluation of efficacy of radioprotective agents still cause some difficulties. Broad use is made in electrochemical and radiobiological studies of pulsed application of potential of positive and negative polarity in order to activate

the surface of hard electrodes and measure partial oxygen tension in solution and animal tissues. It has also been shown that oscillographic polarography, application of high-speed potential, can be used to demonstrate electrochemically inert substances in solutions due to their adsorption on the electrode. We have tried here to utilize the principles of both methods to prove the existence of adsorption in sulfur-containing radioprotective agents on a smooth Pt electrode and possibility of using the method of anode-cathode activation (ACA) to determine the rate of dissemination of these substances in mammalian tissues. B.W.

N83-36665# National Inst. for Personnel Research, Johannesburg (South Africa).

HUMAN INFORMATION PROCESSING: NEUROLOGICAL SUBSTRATE

T. R. TAYLOR Nov. 1981 63 p refs
 (CSIR-SR-PERS-331; ISBN-0-7988-1876-X) Avail: NTIS HC A04/MF A01

The neuropsychological literature in areas relevant to information processing was surveyed. A guide from another discipline for psychologically orientated students of information processing is offered. It is hoped that insights from neuropsychology will help to place psychological theorizing about information processing on a firmer basis. S.L.

N83-36666# Michigan State Univ., East Lansing. Dept. of Biomechanics.

A FOUNDATION FOR SYSTEMS ANTHROPOMETRY: LUMBAR/PELVIC KINEMATICS Final Report, 22 Feb. 1981 - 22 Feb. 1982

H. M. REYNOLDS and S. C. LEUNG Wright-Patterson AFB, Ohio AMRL 11 May 1983 104 p refs
 (Contract F33615-81-C-0506; AF PROJ. 2313)
 (AD-A129517; AFAMRL-TR-83-016) Avail: NTIS HC A06/MF A01 CSCL 06P

Research protocol and results from System Anthropometry Laboratory's three-dimensional investigation of the lumbar/pelvis linkage system are presented. A stereoradiographic system measures three-dimensional coordinates of implanted targets in the skeletal system of an unembalmed cadaver seated in a wooden seat conforming to Air Force specifications. The cadaver is experimentally positioned to obtain three-dimensional data on lumbar extension, flexion, and lateral sidebending motions. Data are analyzed to provide a screw axis description of the instantaneous axis of rotation for each change of position. In addition, position vectors are calculated that describe locations of the bones in the lumbar/pelvic linkage system and a point on the screw axis closest to the origin of the bone frame of reference. The data are presented in three-dimensional coordinates measured in a laboratory with a spatial accuracy of approximately + or minus 0.03 cm. The extensive references to measurement and measurement techniques studies offer a listing not presented elsewhere in the literature, or in other reviews of the literature, and with particular application to systems anthropometry, from the fields of anthropometry, osteology, kinematics, and three-dimensional measurement techniques. GRA

N83-36667# Oak Ridge National Lab., Tenn. Chemical Effects Information Center.

CHEMICALS IDENTIFIED IN HUMAN BIOLOGICAL MEDIA: A DATA BASE Annual Report

M. V. CONE, M. F. BAIDAU, D. M. OPRESKO, and M. S. UZIEL Oct. 1982 480 p
 (Contract W-7405-ENG-26)
 (DE83-006369; ORNL/EIS-163-VOL-5-PT-2; EPA-56015-82-003B; AR-4) Avail: NTIS HC A21/MF A01

A comprehensive data base of chemicals identified in human biological media (tissues and body fluids) has been established. This two-part volume is the annual publication of the data base for 1982. Data were obtained primarily from the open literature through manual searches (retrospective to 1974). The data now contains information on over 1000 different substances, all of which are listed by Chemical Abstracts Service (CAS) preferred names.

The data base is published annually in tabular format with indices and chemical listings that allow specific searching. The purpose of the data base is to provide a centralized resource of body-burden data, and in no way is it intended to obviate the need for the user to ultimately refer to the original literature or data source.

DOE

N83-36668# Rochester Univ., N. Y. School of Medicine and Dentistry.

MICROWAVE HAZARDS: RISK ASSESSMENT IN PERSPECTIVE

S. M. MICHAELSON 1983 3 p Presented at the 18th Ann. Microwave Power Symp. Philadelphia, 18 Jul. 1983 (Contract DE-AC02-76EV-03490)

(DE83-010229; DOE/EV-03490/2268; UR-3490-2268; CONF-830715-1) Avail: NTIS HC A02/MF A01

In assessing the risk to humans from microwave radiation a distinction is drawn between a biological effect and a hazard. It is the author's contention there is no demonstrable biologic effect that may be hazardous to health or safety or to the general biological environment as a result of the ambient levels of electromagnetic energy emitted by microwave emitting devices and communications systems.

DOE

N83-36669# National Academy of Sciences - National Research Council, Washington, D. C. Committee on Hearing, Bioacoustics and Biomechanics.

OVERVIEWS OF EMERGING RESEARCH TECHNIQUES IN HEARING, BIOACOUSTICS AND BIOMECHANICS: PROCEEDINGS OF THE 1981 MEETING Annual Report

1982 142 p refs Meeting held in Washington, D.C., 13-14 Nov. 1981 Sponsored in part by ONR

(PB83-218016) Avail: NTIS HC A07/MF A01 CSCL 06D

Hair function, transduction process of hair cells, and speech synthesis are discussed. Machine recognition of words; neuromagnetic analysis of sensory systems; tinnitus; tactile communication of speech; and biodynamic research are also included.

GRA

N83-36670# Environmental Protection Agency, Corvallis, Oreg. Environmental Research Lab.

INTRASPECIFIC VARIABILITY IN METABOLIC RESPONSES TO SO₂

D. T. TINGEY and D. M. OLSZYK Jun. 1983 72 p refs (PB83-215103; EPA-600/D-83-048) Avail: NTIS HC A04/MF A01 CSCL 06T

Variation in metabolic responses to sulfur dioxide is widespread within many plant species. Plant responses are a consequence of a series of biochemical and physiological events beginning with SO₂ flux into plant and progressing through perturbation, and homeostasis, and ending with foliar injury and/or effects on growth and yield. Gas-phase and liquid-phase conductance are important determinations of SO₂ flux. However, the relationship between variation in these factors and plant response is incompletely understood-at least in part because of difficulties with SO₂ gas-exchange methodology. Perturbation events occurring primarily in the chloroplast, and homeostatic mechanisms have received only brief attention.

Author (GRA)

N83-36671# Science Applications, Inc., Los Angeles, Calif. **CARBON MONOXIDE INTRUSION IN SUSTAINED-USE VEHICLES Final Report**

R. A. ZISKIND, M. B. ROGOZEN, I. ROSNER, and T. CARLIN. Mar. 1983 174 p refs

(Contract EPA-68-02-3220)

(PB83-209999; SAI-1-068-80-535; EPA-600/4-82-002) Avail: NTIS HC A08/MF A01 CSCL 06E

Section 226 of the Clean Air Act Amendments of 1977 directed the USEPA to perform a study of carbon monoxide (CO) exposures in the passenger area of sustained use vehicles, i.e., buses taxis, and police cars. A field investigation of vehicle CO levels in two metropolitan areas was conducted. Study objectives were to determine if CO concentrations in the passenger area of

sustained-use vehicles is a health concern; to identify conditions and vehicle types conducive to high interior CO exposures, and intrusion mechanisms for such vehicles; and to recommend steps for identifying hazardous vehicles/driving conditions and for reducing CO exposures. CO was measured with passive dosimeters, active personal samplers, and continuous electrochemical analyzers; a tracer gas detection system was used to identify intrusion pathways.

Author (GRA)

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BEHAVIORAL SCIENCES

Includes psychological factors; individual and group behavior; crew training and evaluation; and psychiatric research.

A83-47096

THE PSYCHOLOGY OF INTERGROUP RELATIONS [PSIKHLOGIJA MEZHGRUPPOVYKH OTNOSHENII]

V. S. AGEEV Moscow, Izdatel'stvo Moskovskogo Universiteta, 1983, 144 p. In Russian. refs

A wide variety of topics concerning different aspects of intergroup perception and intergroup interrelations is examined. The concepts of action-related mediation of intergroup activity are discussed, based on the results of experimental investigations. A critical analysis is presented of the main directions in the investigation of intergroup relations by researchers outside of the USSR. Topics addressed include intergroup relations as an area of social-psychological knowledge, the characteristics of intergroup perception in conditions of intergroup competition, the effect of success or failure in intergroup competition on the parameters of intergroup interaction and the characteristics of intergroup perception, and intergroup interrelations and intragroup social-psychological processes.

N.B.

A83-48123

INHIBITION AND FACILITATION OF APPARENT MOTION BY REAL MOTION

M. GREEN (Freiburg, Universitaet, Freiburg im Breisgau, West Germany) Vision Research (ISSN 0042-6989), vol. 23, no. 9, 1983, p. 861-865. Sponsorship: Deutsche Forschungsgemeinschaft. refs (Contract DFG-SFB-70; DFG PROJECT A6)

Observers viewed a CRT display which contained both real and apparent motion. When the apparent motion was in the same direction as the real motion, the strength of the apparent motion was enhanced. Real motion in the opposite direction completely cancelled apparent motion. However, the appearance of the real motion was not affected by apparent motion.

Author

A83-48882

PERFORMANCE EVALUATION TESTS FOR ENVIRONMENTAL RESEARCH (PETER) - MORAN AND COMPUTER BATTERIES

A. C. BITTNER, JR., R. C. CARTER, M. KRAUSE, R. S. KENNEDY, and M. M. HARBESON (U.S. Navy, Naval Biodynamics Laboratory, New Orleans, LA) Aviation, Space and Environmental Medicine (ISSN 0095-0562), vol. 54, Oct. 1983, p. 923-928. Navy-supported research. refs

An evaluation is presented of nine cognitive ability tasks for repeated measures applications and inclusion in the Performance Evaluation Tests for Environmental Research (PETER) battery. Five tasks from the Moran Battery (Moran and Mefferd, 1959), adapted from the French (1954) kit of factor-referenced tests, were administered in the first test to 18 subjects daily for 13 workdays. In the second study, four tasks selected from the Carter and Sbisà (1982) Computer Generated Battery were administered daily to 17 subjects (12 in common with the first study) for 15 workdays. Data for the means, variances, interday reliabilities, and the factor analysis of the cross-task correlations were evaluated. These findings indicate that four tasks may be recommended for repeated

measures applications: vertical addition, perceptual speed, grammatical reasoning, and flexibility of closure. N.B.

A83-48883

PSYCHIATRIC ASSESSMENT OF FEMALE FLIERS AT THE U.S. AIR FORCE SCHOOL OF AEROSPACE MEDICINE (USAFSAM)
D. R. JONES (USAF, School of Aerospace Medicine, Brooks AFB, TX) Aviation, Space and Environmental Medicine, vol. 54, Oct. 1983, p. 929-931.

An analysis is presented of 17 female fliers referred for evaluation to the Neuropsychiatry Branch, Clinical Sciences Division, of the USAF School of Aerospace Medicine between October 1976 and September 1982. Five of the fliers were referred primarily for emotional reasons, seven primarily for somatic disorders and only secondarily for emotional symptoms, two for entry to the Airsickness Rehabilitation/Treatment protocol, and three for routine evaluation in preparation for possible space flight. Although the number of cases is too small for statistical analysis, a general theme with clinical importance has been identified in these cases. It is found that a significant number of male fliers tend to see these female fliers in stereotyped roles (such as a potential sexual partner or a little sister) and then respond to the assigned role rather than to a real person. The existence of such a role may affect the real-life role of the female flier, whether she accepts this projected role or rejects it. The behavioral manifestations of such role-casting are real, even though they may be carried on subconsciously, and may have the potential for affecting flight safety. N.B.

A83-48884

PERSONALITY PROFILES OF PILOTS

A. ASHMAN and R. TELFER (Newcastle, University, Newcastle, Australia) Aviation, Space and Environmental Medicine (ISSN 0095-0562), vol. 54, Oct. 1983, p. 940-943. refs

Results are presented for samples of Australian Air Force fighter pilots, trainee commercial pilots, and males drawn from the general community in Australia who completed the Edwards Personality Preference Schedule (EPPS). Three significant effects were found for individual subscales (achievement, affiliation, and nurturance) which identified air force fighter pilots, whereas commercial pilot trainees were found to score significantly less than the community sample on succorance and nurturance. These findings indicate that the EPPS consists of several related personality dimensions, one of which ('sociability') discriminated fighter pilots from the general community. N.B.

A83-50109

MULTI-OSCILLATORY CONTROL OF CIRCADIAN RHYTHMS IN HUMAN PERFORMANCE

S. FOLKARD (Sussex, University, Brighton, England), R. A. WEVER, and C. M. WILDGRUBER (Max-Planck-Institut fuer Psychiatrie, Andechs, West Germany) Nature (ISSN 0028-0836), vol. 305, Sept. 15, 1983, p. 223-226. refs

The possible shift of the rhythm of working memory performance from the sleep wake cycle and the temperature rhythm to a period of less than 24 hr was investigated. Wever's fractional desynchronization technique (1983) was used with seven subjects who were exposed to artificial zeitgebers (day-length cues) for 28 days in an isolated environment. Three subjects experienced progressive 5 min light/dark shortened days to 22 hr, while four were presented with progressively lengthening days until a 29 hr day was established. All trials were punctuated by periodic gong sounds, which signaled the commencement of a simple letter cancellation task and a complex verbal reasoning task. Correct answers and bodily temperature data were treated by linear regression analysis of the acrophase values. Verbal reasoning was found to be controlled by an underlying oscillator with an autonomous 21 hr clock. The simple letter cancellation tasks was correlated with the body temperature oscillator. D.H.K.

N83-35637# Navy Personnel Research and Development Center, San Diego, Calif.

HUMAN INDIVIDUAL DIFFERENCES IN MILITARY SYSTEMS Special Progress Report for period ending FY82

R. C. SORENSON Apr. 1983 31 p refs
(Contract ZR00001042)
(AD-A128496; NPRDC-SR-83-30) Avail: NTIS HC A03/MF A01 CSCL 05A

During the last 40 years, two concepts have become increasingly important to those considering military matters as well as to society in general. The first concept, termed Systems Thinking deals with sets of elements in which the behavior of each element affects the behavior of the whole; the behavior of each element and its effects on the whole are influenced by the behavior of other elements; and elements in the set are so connected that independent subgroups cannot be formed. The key to systems thinking is synthesis, the putting of elements together and considering their connections and interactions. The second concept is that of the role of human beings. Humans are not simply the owner-operators of the system, somehow standing aloof and manipulating it to suit their ends. Humans are elements in the set of elements forming the system. This report deals with the pervasiveness of human individual differences (ID) and discusses the characteristics of systems to take advantage of IDs in the military. GRA

N83-35638# Army War Coll., Carlisle Barracks, Pa.

WHAT ARE LITTLE GIRLS MADE OF?

S. S. BOENING 8 Apr. 1983 20 p refs
(AD-A128294) Avail: NTIS HC A02/MF A01 CSCL 05I

Since the demise of the Women's Army Corps; the Army has suffered from the absence of a basic philosophy on the proper utilization of women. Four possible ways of looking at the role of women in the society and Army are examined. The Army needs to select one as a consistent base for logical, explainable policy. GRA

N83-35639# Research Inst. of National Defence, Stockholm (Sweden). Dept. 5.

GROUND-TO-AIR ESTIMATION OF TRUE TRACK OF AIRCRAFT

B. NORLIN and G. FRENZEL-NORLIN Apr. 1983 33 p refs
In SWEDISH; ENGLISH summary
(FOA-C-56037-H2; ISSN-0347-7665) Avail: NTIS HC A03/MF A01

Eight aircraft-spotters estimated the true track of aircraft, using simple circular devices equipped with a turnable pointer and graded 0 to 360 deg. An aircraft flew predetermined routes (altitude 1400 ft, IAS 320 kt) and was tracked by radar. The perpendicular distance from the tracks to the observation point varied between 0 and 5.2 km. The 38 tracks were estimated twice, making a total of 604 observations. No feedback was given throughout the experiment. Average absolute deviation from actual true track is 10 deg. Deviation is 30 deg for 20% of the estimations. An analysis of variance indicates a significant effect of perpendicular distance from track to observation point at p0.01. The same analysis shows interindividual differences to be significant at p0.01. Comparisons of various aids for true track estimation and studies of the effects of training are suggested. Author (ESA)

53 BEHAVIORAL SCIENCES

N83-35640# Ecole Nationale Supérieure des Telecommunications, Paris (France). Dept. Systemes et Communications.

STUDY OF IMAGE CONTOUR SAMPLING AND CONSTRUCTION OF A MODEL FOR THE PSYCHOPHYSICAL EVALUATION OF CONTOUR PHASE DEGRADATION Ph.D. Thesis [ETUDE OBJECTIVE DE L'ECHANTILLONNAGE DES CONTOURS D'IMAGE ET REALISATION D'UNE MAQUETTE POUR L'EVALUATION PSYCHOPHYSIQUE DES DEGRADATIONS DE PHASE SUR LES CONTOURS]

S. TRAVERT 17 Mar. 1918 131 p refs In FRENCH (ENST-E-83003) Avail: NTIS HC A07/MF A01

An image contour sampling degradation analysis is carried out, considering perfect image contours and then image contours after filtering. The mathematical tools used include Fourier transformation, three dimensional Dirac distributions and three dimensional Shannon theorem. Definition of four sampling structures and their transformations are given. It is shown that perfect contour sampling by three dimensional sampling structures produces space-time phase degradation on the contours. The space characteristics (longitudinal frequency and peak to peak amplitude) do not depend on the motion but on the orientation of the contour. It is demonstrated that the phase degradation may be simulated by amplitude degradation at the peak of contour transition. A physical model of image contour degradation, which provides a test method of human visual perception of phase degradation on image contours is described. Author (ESA)

N83-35641# American Airlines, Inc., Euless, Tex. Training Center.

ALASKAN AVIATION TRAINING REQUIREMENTS Final Report M. K. MITCHELL, C. F. EICHHORN, and M. J. WILD Jul. 1982 191 p Sponsored in part by the Alaskan Aviation Safety Foundation (PB83-192310; NORTH RESEARCH-7) Avail: NTIS HC A09/MF A01 CSCL 05J

The goal of American Airlines Training Corporation is to provide effective flight training in Alaska, based on information gathered from experienced Alaskan pilots, and AATC's capability in aviation training systems. It is believed that this training will produce a highly qualified, professionally oriented pilot and will result in a lower accident rate. AATC and the AASF also have worked with insurance underwriters attempting to obtain insurance premium reductions for personnel completing the proposed Alaskan aviation training program. Several underwriters have expressed approval of reducing insurance premiums based on training. GRA

N83-35642# Maryland Univ., College Park. Fire Protection Curriculum Office.

IMPLICATIONS FOR CODES AND BEHAVIOR MODELS FROM THE ANALYSIS OF BEHAVIOR RESPONSE PATTERNS IN FIRE SITUATIONS AS SELECTED FROM THE PROJECT PEOPLE AND PROJECT PEOPLE 2 STUDY PROGRAMS Final Report

J. L. BRYAN Mar. 1983 218 p refs Sponsored in part by Dept. of Health and Human Services, Washington (Contract NB80-NADA-1067) (PB83-198507; NBS-GCR-83-425) Avail: NTIS HC A10/MF A01 CSCL 05J

An analysis of the previous Project People and the Project People II studies in relation to the identification of behavior response patterns is described. These response patterns are compared to the established and previously formulated models of behavior, and the provisions of the regional building codes and the NFPA Life Safety Code. The premodal concepts of Archea and Withey in relation to the identified behavioral response patterns of the participants in both the Project People study involved primarily with residential occupancies, and the Project People II study involved primarily with health care occupancies are evaluated. The 1981 edition of the Code for Safety to Life from Fire in Buildings and Structures of the National Fire Protection Association, is also compared to the identified behavioral response patterns from the participants in both the Project People and the Project People II studies. GRA

N83-36672*# Columbia Univ., New York. Psychophysics Lab. **HUMAN ANNOYANCE RESPONSE TO AIRCRAFT NOISE Final Technical Report**

E. GALANTER 31 Jul. 1983 106 p refs (Contract NSG-1550) (NASA-CR-174462; NAS 1.26:174462) Avail: NTIS HC A06/MF A01 CSCL 05J

Human annoyance response to aircraft noise is studied. Subject matter covered includes: emotional response to acoustic noise; loudness differences and scaling techniques.

N83-36673*# Columbia Univ., New York. Psychophysics Lab. **HUMAN ANNOYANCE RESPONSE TO AIRCRAFT NOISE, INTRODUCTION Final Technical Report**

E. GALANTER *In its* Human Annoyance Response to Aircraft Noise p 1-2 31 Jul. 1983 Avail: NTIS HC A06/MF A01 CSCL 05J

The objective of these efforts was to find ways to control the salient features of the annoyance function, and so reduce community annoyance responses. It was found that changing identified parameters of a model could lead to altered response. Environmental variables that can be located by a theoretical model may offer a high benefit/cost ratio in effecting a reduction of annoyance. Multiple exposure models of human annoyance were developed that broke with mere acoustic additivity of one or another kind. A new scaling technique was developed that permits the assignment of numerical values to aversive or desirable events. B.W.

N83-36674*# Columbia Univ., New York. Psychophysics Lab. **TEMPORAL CHARACTERISTICS OF EMOTIONAL RESPONSE: A DECAY MODEL OF ANNOYANCE RESPONSE TO ACOUSTIC NOISE Final Technical Report**

In its Human Annoyance Response to Aircraft Noise p 4-45 31 Jul. 1983 refs Avail: NTIS HC A06/MF A01 CSCL 05J

Blatz demonstrated in 1925 that physiological responses to a fear-provoking stimulus increase sharply at the onset of the stimulus and eventually return to their respective resting states. If physiological responses to emotion-provoking stimuli decay after the onset of the stimuli, then it is hypothesized that so will the emotional state (subject, of course, to cognitive and other contextual factors, Buck, 1976; Schachter & Singer, 1962). A series of experiments are proposed to demonstrate the existence of this change in emotional state as well as to estimate temporal parameters for specific emotion-provoking situations. Author

N83-36675*# Columbia Univ., New York. Psychophysics Lab. **SCALING LOUDNESS DIFFERENCES BY INTRA-MODAL MATCHING: EVIDENCE FOR A SINGLE SCALE UNDERLYING LOUDNESS AND LOUDNESS DIFFERENCE Final Technical Report**

R. D. POPPER *In its* Human Annoyance Response to Aircraft Noise p 46-104 31 Jul. 1983 refs Avail: NTIS HC A06/MF A01 CSCL 05J

The perception of loudness was studied in four experiments. In Experiments 1 and 2 (difference matching), subjects judged the magnitude of loudness differences by adjusting the loudness of a single tone to equal the loudness difference between a pair of tones. Seventy-two tone pairs were used, constructed from nine sound pressure levels of a 1000 Hz tone ranging from 46-94 dB (Experiment 1) of 55-95 dB (Experiment 2). In Experiment 3 (difference estimation), subjects magnitude-estimated the loudness differences of the same tone pairs as in Experiment 2, and in Experiment 4 they magnitude estimated the loudness of the individual tones used to construct the tone pairs. The same subjects served in Experiments 2-4, and binaural listening through earphones was used throughout. Author

N83-36676# Rice Univ., Houston, Tex. Dept. of Psychology.
THE EFFECT OF TASK CHARACTERISTICS ON THE AVAILABILITY HEURISTIC FOR JUDGEMENTS UNDER CERTAINTY

G. FONTENELLE May 1983 75 p refs
 (Contract N00014-82-C-0001; NR PROJ. 197-074)
 (AD-A130178; TR-83-1) Avail: NTIS HC A04/MF A01 CSCI
 12A

The present study sought to generalize the effect of the availability heuristic to more complex tasks and across various task categories. The experimental design involved the manipulation of event characteristics in order to induce a heuristic processing strategy for designated available events. The effect of these manipulations was investigated for three types of response measures and across a range of event frequencies. Results demonstrated the generalizability of the availability heuristic across complex tasks and three types of response measures--frequency estimation, probability estimation, and choice predictions. The availability of an event in memory produced an overestimation of the frequency and probability of event occurrences. Similarly, choice predictions judged available events as more likely to occur. However, this effect was not consistent across all levels of assigned event frequencies. The present study extended the generalizability of the availability heuristic to more complex tasks and provided an exploratory step toward defining the degree to which basic findings hold across a range of task characteristics. GRA

N83-36677# Kansas Univ., Lawrence. Dept. of Psychology.
ITEM RESPONSE THEORY: SOME STANDARD ERRORS Final Report

D. THISSEN (Educational Testing Service) and H. WAINER Brooks AFB, Tex. AFHRL May 1983 41 p refs
 (Contract F41689-81-C-0012; AF PROJ. 2313)
 (AD-A129804; AFHRL-TP-83-12) Avail: NTIS HC A03/MF A01 CSCI 051

The mathematics required to calculate the asymptotic standard errors of the parameters of three commonly used logistic item response models is described and used to generate values for some common situations. It is shown that the maximum likelihood estimation of a lower asymptote reduces the accuracy of estimation of a location parameter. If one requires accurate estimates of location parameters (e.g., for purposes of test linking/equating or for computerized adaptive testing), the sample sizes required for acceptable accuracy may be so large as to make maximum likelihood estimation infeasible in most applications. It is suggested that other estimation methods be used if the three-parameter model is applied in these situations. Author (GRA)

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MAN/SYSTEM TECHNOLOGY AND LIFE SUPPORT

Includes human engineering; biotechnology; and space suits and protective clothing.

A83-47301#
ADVANCED VISUAL STIMULATION DEVICE USING MINIATURE TV RECEIVER

I. SAITO (Research Foundation on Traffic Medicine, Tokyo, Japan) and Y. SUGIYAMA (Nihon Kodan Corp., Japan) International Astronautical Federation, International Astronautical Congress, 34th, Budapest, Hungary, Oct. 10-15, 1983. 2 p.
 (IAF PAPER 83-180)

A visual stimulation device complete with a miniature television camera employed to examine the visual causes of motion sickness in space is described, together with experimental results. The television screen is placed on either side of the eye and magnified. Optokinetic moving horizontal and vertical patterns are presented, as are obliquely moving patterns. The subject is seated on a

rotating chair in order to receive the same stimulation provided by spaceflight. The device is specifically intended to examine the conflict between visual and vestibular sensation experienced by astronauts in microgravity in enclosures where normal room orientations do not correspond with the gravitational environment.

M.S.K.

A83-48569

THE CONTROL LEVELS OF IONIZING RADIATION IN THE WORKPLACE [K VOPROSU O KONTROL'NYKH UROVNIAXH IONIZIRUIUSHCHIKH IZLUCHEENII NA RABOCHIKH MESTAKH]
 A. A. RYMARCHUK and A. S. CHEKANOV Voenno-Meditsinskii Zhurnal (ISSN 0026-9050), July 1983, p. 47-51. In Russian. refs

The idea of a control level of ionizing radiation for determining the safety of both individuals directly working with sources of radiation and individuals either living or working in proximity to these sources of ionizing radiation is examined. The control level is based on the maximum amount of exposure to ionizing radiation over a period of time such as an entire year. It is shown that control levels take into account the amount of time spent working with radiation sources of different strengths, and the maximum allowable limit is determined by the total exposure during the course of the entire year and not just by the length of the exposure to a specific source of ionizing radiation. N.B.

A83-48693#

HAZARDS OF LOOSE HARNESS DURING FLYING

R. SINGH (Indian Air Force, Institute of Aviation Medicine, Bangalore, India) Aviation Medicine, vol. 27, June 1983, p. 48-50. refs

Two cases of ejection and two cases of aircraft accidents in the Indian Air Force are analyzed in order to determine the role of loose harnesses in the restraint system as a factor in injuries and fatalities. It is determined that slackness in the harness system can be a contributory cause of injury or can increase the severity of the injuries. In addition, it is demonstrated that certain aircraft harness systems have inherent limitations which automatically amplify the forces during ejection and provide inadequate restraint in an otherwise survivable accident. Several recommendations are proposed for minimizing the incidence of spinal injuries during ejection and survivable accidents. N.B.

A83-48694#

A MODIFIED TECHNIQUE FOR ESTIMATION OF ETHANOL IN BODY FLUIDS BY GAS LIQUID CHROMATOGRAPHY

S. K. ADAVAL (Command Hospital Air Force, Bangalore, India), G. N. KUNZRU, and N. K. MARUTHIRAM Aviation Medicine, vol. 27, June 1983, p. 51-54. refs

A technique is developed for determining very small quantities of ethanol in blood and urine using a gas chromatograph. This technique is a modification of the method developed by Curry et al. (1966). Plasma is used instead of whole blood in order to prevent blocking of the syringe during injection. Purified ethanol is employed as an internal standard since propanol contains a small amount of ethanol as an impurity. Nitrogen as a carrier gas at 10 psi (flow rate of 50 ml/min) is found to yield satisfactory results. It is demonstrated that concentrations of ethanol as low as 0.5 mg/100 ml could be detected using this technique. N.B.

A83-48695#

CRYOGENIC LIQUIDS AND AVIATION

B. SINGH (Indian Air Force, Institute of Aviation Medicine, Bangalore, India) Aviation Medicine, vol. 27, June 1983, p. 55-58.

A review is presented of the various uses of cryogenic liquids (liquefied cold gases) in aviation. Attention is focused on the advantages and problems of employing liquid oxygen as a source of high purity breathing oxygen for use in aviation. Recent technical advances which facilitate the utilization of liquid oxygen in military aircraft are discussed. Also examined are the biological effects of cold liquids, including the effects on biological tissues, the effects on skin, and the effects on the lungs. In addition, other aspects connected with the use of cryogenic liquids in aviation are

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considered, including the problems of handling, ventilation, protective clothing, and the treatment of cold injuries. N.B.

N83-35620# Joint Publications Research Service, Arlington, Va.
OPTIMIZATION OF PROCESS OF STORING HOUSEFLY PUPAE FOR UTILIZATION OF ORGANIC WASTE IN BIOLOGICAL LIFE-SUPPORT SYSTEM

Y. G. GOLUBEVA and V. V. NOSOV *In its* USSR Rept.: Space Biol. and Aerospace Med., Vol. 17, No. 3, May - Jun. 1983 (JPRS-83828) p 89-93 6 Jul. 1983 refs Transl. into ENGLISH from Kosmich. Biol. i Aviakosmich. Med. (Moscow), v. 17, no. 3, May - Jun. 1983 p 63-65

Avail: NTIS HC A08

The method of experiment orthogonal planning was used to study the combined effect of three factors (ambient temperature, humidity, and storage time) on the yield characteristics of the storage of *Musca domestica* L. pupae as utilizers of organic wastes in the biological life support system. The application of the type 2(3-1) fractional factorial experiment with the generating ratio $x_3 = x_2 \times x_1$ and analysis of the resultant regression equation showed that the pupal viability tended to grow as the temperature increased and the time storage and humidity decreased. Step-by-step optimization according to Box-Wilson gave the following optimal conditions for pupal storage (without viability losses): ambient temperature +16 C, relative humidity 37 to 39%, and storage time 15 days. Author

N83-35643 Oklahoma State Univ., Stillwater.
SYNTHESIS OF ROBOTS/MANIPULATORS FOR A PRESCRIBED WORKING SPACE Ph.D. Thesis

Y. C. TSAI 1982 188 p

Avail: Univ. Microfilms Order No. DA8300184

A new algorithm, which can plot the contour of the workspace of a general n-R robot, is developed. The revoloute joints may make complete rotation or rotate within motion limits. The robot hand can be treated as a point, a line or a rigid body. The effects of link parameters on the workspace and dexterity of 3-R robot are studied. Valuable design charts are provided. And the optimum regional structure and orientational structures of robots are determined. Synthesis procedures of 2-R, 3-R, 4-R, 5-R, and 6-R industrial robots for a specified working space are developed, and illustrated with examples. Dissert. Abstr.

N83-35644 Florida Univ., Gainesville.

A PROCESS FOR REMOVAL OF TOXIC GASEOUS COMBUSTION PRODUCTS FROM SPACECRAFT ATMOSPHERE Ph.D. Thesis

G. P. NOYES 1983 115 p

Avail: Univ. Microfilms Order No. DA8302276

The selection and evaluation of a process for essentially complete removal from incineration exhaust of the primary toxic gaseous products of organic waste combustion, namely carbon monoxide (CO), sulfur dioxide (SO₂), and nitrogen oxides (NO_x) is discussed. The process selected for evaluation was staged countercurrent bubble column absorption of these pollutant gases into aqueous hydrogen peroxide (H₂O₂) solutions acidified with the products, mainly sulfuric acid (H₂SO₄) and nitric acid (HNO₃), of pollutant oxidation and hydration in the absorbent solution. Simulated incineration exhaust containing the pollutant gases was bubbled through a single stage column of acidified H₂O₂ solutions at constant temperature (50 C) and gas flow. Experiments were performed to determine pollutant outlet concentrations from bubble columns with different pollutant species and inlet concentrations in the gas and different acid species (H₂SO₄ and HNO₃) and H₂O₂ and acid concentrations in the liquid. Dissert. Abstr.

N83-35645*# Springborn Labs., Inc., Enfield, Conn.
PROTOTYPE WASH WATER RENOVATION SYSTEM INTEGRATION WITH GOVERNMENT-FURNISHED WASH FIXTURE Final Report, 18 Jan. 1982 - 1 Jun. 1983

1 Jun. 1983 68 p

(Contract NAS9-16501)

(NASA-CR-171697; NAS 1.26:171697) Avail: NTIS HC A04/MF A01 CSCL 06K

A total renovation concept for removing objectionable materials from spacecraft wash water to make the water reusable was developed. This concept included ferric chloride pretreatment to coagulate suspended solids such as soap and lint, pressure filtration, and carbon adsorption and ion exchange to remove trace dissolved organics and inorganic salts. A breadboard model which was developed to demonstrate the design adequacy of the various system components and the limits on system capacities and efficiencies. E.A.K.

N83-35646*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

A RATE-CONTROLLED TELEOPERATOR TASK WITH SIMULATED TRANSPORT DELAYS

J. E. PENNINGTON Sep. 1983 46 p refs

(NASA-TM-85653; L-15561; NAS 1.15:85653) Avail: NTIS HC A03/MF A01 CSCL 05H

A teleoperator-system simulation was used to examine the effects of two control modes (joint-by-joint and resolved-rate), a proximity-display method, and time delays (up to 2 sec) on the control of a five-degree-of-freedom manipulator performing a probe-in-hole alignment task. Four subjects used proportional rotational control and discrete (on-off) translation control with computer-generated visual displays. The proximity display enabled subjects to separate rotational errors from displacement (translation) errors; thus, when the proximity display was used with resolved-rate control, the simulated task was trivial. The time required to perform the simulated task increased linearly with time delay, but time delays had no effect on alignment accuracy. Based on the results of this simulation, several future studies are recommended. Author

N83-35647# National Academy of Sciences - National Research Council, Washington, D. C. Committee on Human Factors.

RESEARCH NEEDS FOR HUMAN FACTORS

R. W. PEW, N. S. ANDERSON, A. CHAPANIS, B. FISCHOFF, and I. L. GOLDSTEIN Jan. 1983 219 p refs

(Contract N00014-81-C-0017)

(AD-A129899; RESEARCH-NOTE-83-07) Avail: NTIS HC

A11/MF A01 CSCL 05E

This report describes basic research needed to improve the scientific basis of applied human factors work. Six topical areas are covered; human decision making; eliciting information from experts; user-computer interaction; supervisory control systems; population group differences; and applied methods.

Author (GRA)

N83-35648# California Univ., Livermore. Lawrence Livermore Lab. Dept. of Electrical and Computer Engineering.

ROBOTICS RESEARCH PROJECTS REPORT

T. C. HSIA, ed. Jun. 1983 59 p refs

(Contract W-7405-ENG-48)

(DE83-013619; UCID-19816; RRL-82-1) Avail: NTIS HC

A04/MF A01

The research results of the robotics research laboratory are summarized. Areas of research include robotic control, a stand alone vision system for industrial robots, and sensors other than vision that would be useful for image ranging, including ultrasonic and infrared devices. One particular project involves RHINO, a 6-axis robotic arm that can be manipulated by serial transmission of ASCII command strings to its interfaced controller. DOE

N83-35649# Research Inst. of National Defence, Stockholm (Sweden). Dept. 5.

TESTS OF A MINI STOVE FOR SWEDISH AIR FORCE SURVIVAL KITS

B. FRANSSON and C. SPAANGBERG Apr. 1983 18 p refs In SWEDISH; ENGLISH summary (FOA-C-59005-H1; ISSN-0347-7665) Avail: NTIS HC A02/MF A01

A solidified alcohol jelly was tested in order to investigate its suitability for survival kit stoves. A solidified alcohol jelly, contained in a simple cooker, and a Meta Cooker with Meta Fuel Tablets were compared. The results show a very small difference between the jelly and the Meta Fuel in heating capacity but the alcoholic jelly has great handling advantages. Author (ESA)

N83-35650# National Bureau of Standards, Washington, D.C. Building Physics Div.

SOME CRITERIA FOR COLORS AND SIGNS IN WORKPLACES Final Report, 1978 - 1983

R. A. GLASS, G. L. HOWETT, K. LISTER, and B. L. COLLINS Apr. 1983 99 p refs Sponsored in part by Occupational Safety and Health Admin., Washington (PB83-201442; NBSIR-83-2694) Avail: NTIS HC A05/MF A01 CSCI 05E

The use of safety-related visual displays such as signs and colors in workplace is discussed. The discussion includes a review of relevant national and international standards for safety colors and signs. It also includes a review of measures of spatial resolution in human vision, as well as color sensitivity and color appearance. In addition, research on the effectiveness of safety signs, symbols, and colors is reviewed. Based on the initial literature review, the appearance of safety colors under energy efficient light sources was identified as an area for detailed research. As a result, a laboratory study was conducted in which the color appearance of 45 different color samples under five light sources including energy efficient ones was determined for seven subjects. GRA

N83-35927# Joint Publications Research Service, Arlington, Va. **PROGRAM FOR DEVELOPMENT OF INDUSTRIAL ROBOTS DISCUSSED**

In its USSR Rept.: Sci. and Technol. Policy, No. 17 (JPRS-84366) p 1-5 20 Sep. 1983 Transl. into ENGLISH from Ekon. Gaz. (USSR), no. 22, May 1983 p 2 Avail: NTIS HC A06

The importance and urgency of development of the production and wide spread use of automatic manipulators with program control (industrial robots) and of built-in automatic control systems with the use of microprocessors and microcomputers and of the establishment of automated shops and plants are stressed. Productivity growth simultaneously with the facilitation of labor is one of the most important conditions for the transition to a primarily intensive path of development carried out by economy. Overall mechanization and automation of production, in whose basis the share of automatic manipulators (industrial robots) becomes increasingly weighty, play the leading role in this matter. In contrast to ordinary mechanized and automated devices used in flow lines, mainly during mass output, industrial robots are capable of rapidly resetting themselves and of servicing production facilities with a changing nature of industrial processes. Author

N83-36652# Joint Publications Research Service, Arlington, Va. **SOME DISTINCTIONS OF NUTRITIONAL STATUS WHEN CONSUMING CANNED MEAT ON EMERGENCY SURVIVAL DIETS**

I. G. POPOV, P. A. LOZINSKIY, A. A. LATSKIVICH, and I. A. ROMANOVA In its USSR Rept.: Space Biol. and Aerospace Med., Vol. 17, No. 4, Jul. - Aug. 1983 (JPRS-84412) p 88-99 27 Sep. 1983 refs Transl. into ENGLISH from Kosmich. Biol. i Aviakosmich. Med. (Moscow), v. 17, no. 4, Jul. - Aug. 1983 p 59-68 Avail: NTIS HC A08

Variations in the nutrient status of test subjects who for 5 days were given a survival diet made of 400 g canned meat were

investigated. The energy expenditures of the test subjects were 3000-3200 kcal/day. The study was performed under moderate climate conditions. Anthropometric and biochemical parameters, as well as nitrogen, amino acid, carbohydrate and mineral metabolism were investigated. It was demonstrated that the survival diet of the above composition can be used by the flight personnel in a contingency situation under moderate climate conditions, provided that water supply is about 1 l/day. The study showed sporadic hypoglycemia, intensive ketonemia, heavy salt losses, and early protein deficiency. This should be taken into consideration when arranging rescue operations, rehabilitation nutrition and pilot training. It is understood that adequate preflight nutrition may be of great importance. R.J.F.

N83-36663# Joint Publications Research Service, Arlington, Va. **METHODOLOGICAL APPROACHES TO STUDY OF FACTUAL NUTRITION OF POPULATION AND OF STATE OF ITS HEALTH DUE TO NATURE OF NUTRITION**

G. I. BONDAREV and V. Y. VISSARIONOVA In its USSR Rept.: Life Sci. Biomed. and Behavioral Sci., No. 43 (JPRS-84475) p 14-24 5 Oct. 1983 refs Transl. into ENGLISH from Vopr. Pitaniya (Moscow), no. 3, May - Jun. 1983 p 9-15 Avail: NTIS HC A05

The state of nutrition can be characterized by the sum of indices of factual nutrition, physical development and the health of the population. When studying the status of nutrition of collectives, socio-demographic factors must also be studied: sick rate and work time lost, mortality rate, life expectancy, labor productivity, etc. Methods for evaluating adequacy of nutrition to meet demands of the organism. The study of factual nutrition (regimen, chemical composition, food energy value) is undertaken to uncover nutritional deficiencies and correct and eliminate them according to living conditions. B.W.

N83-36678# Carnegie-Mellon Univ., Pittsburgh, Pa. Inst. for Robotics.

A PROTOTYPE TACTILE SENSOR ARRAY Interim Report

J. P. CHRIST and A. C. SANDERSON 15 Sep. 1982 48 p refs Sponsored in part by NSF (AD-A126362; CMU-RI-TR-82-14) Avail: NTIS HC A03/MF A01 CSCI 09E

Although there are many potential applications for a tactile sensor array, very few practical implementations of such a sensor have been demonstrated. A practical tactile array sensor needs to be very durable, have a high resolution, have a small physical size, be relatively insensitive to noise, and have a compliant surface. In addition there is both physical and electrical coupling between elements of the array which should be eliminated or reduced as much as possible. In order to investigate some of these problems, a prototype tactile sensor was constructed. The sensor was made of a sheet of conductive foam sandwiched between layers of conductors. When the foam is compressed at some point, the resistance through the foam decreases. By selecting the appropriate conductor on each side of the foam, the resistance at any one of 256 points could be measured. The spatial resolution of the sensor was 1/4 inch. As a sample application, an object recognition system was implemented using the sensor. B.W.

N83-36679# Carnegie-Mellon Univ., Pittsburgh, Pa. The Robotics Inst.

DYNAMICALLY STABLE LEGGED LOCOMOTION

M. H. RAIBERT, H. B. BROWN, JR., M. CHEPPONIS, E. HASTINGS, S. M. SESHASHAYEE, and F. C. WIMBERLY 27 Jan. 1983 125 p refs (Contract ARPA ORDER 4148) (AD-A126369; CMU-RI-TR-83-1) Avail: NTIS HC A06/MF A01 CSCI 14B

Balance and dynamic stability in legged systems are studied. Balance in 2D can be achieved with a surprisingly simple control system. The control system has three separate parts, one that controls hopping height, one that controls the velocity of forward travel, and one that controls body attitude. A physical 2D one-legged hopping machine that employs such a three-part control

system hops in place, runs from place to place at speeds of up to 2.7 mph, maintains its balance when disturbed, and leaps over small obstacles. Control of locomotion in 3D can build upon the results obtained in 2D. Simulations suggest that a 3D one-legged machine could run and balance using the same three part controller developed for 2D, provided that additional extra-planar mechanisms operate to suppress roll, yaw, and lateral motions. A physical one-legged system was designed and built that will permit experimentation in the control of balance in 3D. The device has a simple pneumatic leg that is positioned by a hydraulic hip. It will hop on an open floor without a system of physical constraints. A method for obtaining balance that uses tabulated data was developed. The method was extended by showing that the volumous tabular data can be approximated by a polynomial surface of moderate degree, without much loss of control precision.

GRA

N83-36680# Carnegie-Mellon Univ., Pittsburgh, Pa. The Robotics Inst.

ARM DYNAMICS SIMULATION

N. M. SWARTZ 23 Nov. 1982 27 p

(Contract N00014-82-K-0503)

(AD-A126371; CMU-RI-TR-82-17) Avail: NTIS HC A03/MF A01 CSCL 12A

The ability to mathematically model the movement of a robot manipulator is a prerequisite to the understanding of the key factors that influence a manipulator's performance. This paper presents a manipulator model which has been used to simulate and control a real robot arm. A method of describing the arm by its rotational characteristics, a set of equations called the Inverse Arm, and an algorithm called the Forward Arm are presented. The Forward Arm simulates the movement of an arm and the Inverse Arm provides a means of computing the correct voltages to apply to an arm to achieve a desired movement.

Author

N83-36681# Aerospace Medical Research Labs., Wright-Patterson AFB, Ohio. Human Engineering Div.

AN ANNOTATED BIBLIOGRAPHY OF UNITED STATES AIR FORCE ENGINEERING ANTHROPOMETRY - 1946 TO 1983

K. M. ROBINETTE May 1983 103 p Supersedes AMRL-TR-76-58

(Contract AF PROJ. 7184)

(AD-A129981; AFAMRL-TR-83-045; AMRL-TR-76-58) Avail:

NTIS HC A06/MF A01 CSCL 05E

This report contains the titles, authors, publication/source information, and the abstracts of 202 technical reports and articles published by the Air Force Aerospace Medical Research Laboratory from 1946 to 1983. It is a detailed document of the scope of the effort of the Air Force in the field of engineering anthropometry to provide the information on human body size and biomechanical characteristics of Air Force personnel required for the development and evaluation of Air Force systems, personal protective equipment, and clothing.

Author (GRA)

N83-36682# Naval Ocean Systems Center, San Diego, Calif.

NOSC/ONR ROBOTICS BIBLIOGRAPHY, 1961 - 1981

S. Y. HARMON, G. R. MCDEVITT, M. THOMPSON, R. ARGO, S. FERRONE, D. BRUBAKER, and D. GRACE Sep. 1982 97 p

(Contract RR0140901)

(AD-A130591; NOSC/TD-539) Avail: NTIS HC A05/MF A01 CSCL 05B

This document contains a bibliography of the literature directly related to robotics published in the period from 1961 to 1981. This bibliography contains 1066 references. These references are organized into ten topical categories including: general and historical topics; modelling, simulation, design, testing and evaluation, sensors and sensor data processing; operating systems, software development, programming languages and computer architectures, knowledge management; communications and direct robot/human interactions; dynamics and control; effectors; systems and applications, and safety, human factors, standards, management, social, economic and political issues.

GRA

N83-36683# Hershey (Milton S.) Medical Center, Hershey, Pa. Dept. of Behavioral Science.

MEASUREMENT OF TASK PERFORMANCE ON THE BASIS OF THE TIME/EVENT MATRIX: AN EXTENSION OF METHODS

S. STREUFERT Mar. 1983 30 p

(Contract N00014-80-C-0581)

(AD-A129848; TR-12-ONR) Avail: NTIS HC A03/MF A01 CSCL 05H

Previously reported measures of complex task performance are supplemented with a number of new measures. Formulas for calculating all measures now utilized are presented. Data collection on the basis of the time/event matrix is explained. Information about the print-out numbers of the various measures for some recently developed complex man-machine simulations is provided.

Author (GRA)

N83-36684# Army Research Inst. of Environmental Medicine, Natick, Mass.

COMPARISON OF AIR SHOWER AND VEST AUXILIARY COOLING DURING SIMULATED TANK OPERATIONS IN THE HEAT

M. M. TONER, L. L. DROLET, C. A. LEVELL, L. LEVINE, and L. A. STROSCHER Apr. 1983 39 p refs

(Contract DA PROJ. 3E1-62777-A-879)

(AD-A130416; USARIEM-T-2/83) Avail: NTIS HC A03/MF A01 CSCL 06S

An evaluation of the effectiveness of air shower and vest auxiliary cooling was carried out on two tank crews in combat vehicle crewmen clothing and chemical protective clothing. The M1E1 Main Battle Tank was parked in a climatic chamber with environmental conditions of 91 F dry bulb, and 78 F wet bulb temperature. Crewmen performed standard tank exercises in a closed hatched tank for a duration of 2-hours and 45 minutes. Heart rate, rectal and skin temperatures were monitored continuously on each crewmen. Final rectal, mean body and skin temperatures were statistically higher (p less than 0.05) during air shower (99.7, 98.6 and 96.3 F, respectively) compared to vest auxiliary cooling (99.0, 95.2 and 87.6 F, respectively). Final heart rate responses were higher (p less than 0.05) during air shower compared to vest cooling (112 and 91 beats per minute, respectively) for the crews. Total sweat losses were also greater (p less than 0.01) during air shower (1.29 liters) compared to vest test (0.64 liters). One crew attempted the exposure with usage of the M13A1 particulate filter in operation. This exposure was discontinued following the incapacitation of two crewmen within 84 minutes, though thermal strain was only moderate. It is clear that vest auxiliary cooling is more effective for crewmen cooling than an air shower. It must also be emphasized that in these ambient conditions, an air shower provides adequate cooling power.

GRA

N83-36685# Army Test and Evaluation Command, Aberdeen Proving Ground, Md.

COLD REGIONS ENVIRONMENTAL PROTECTION AND DURABILITY TEST OF CLOTHING Final Report

8 Jul. 1983 28 p refs

(AD-A130482; TOP-10-2-510) Avail: NTIS HC A03/MF A01 CSCL 06Q

This TOP prescribes methods for evaluating the durability and protective qualities of clothing developed for cold regions use. It contains procedures for evaluating wind, cold, and snow protection, physical, and thermal durability characteristics. It describes the necessary facilities and instrumentation requirements for test accomplishment.

Author (GRA)

N83-36686# Massachusetts Inst. of Tech., Cambridge. Man-Machine Systems Lab.

SUPERVISORY CONTROL OF REMOTE MANIPULATORS, VEHICLES AND DYNAMIC PROCESSES: EXPERIMENTS IN COMMAND AND DISPLAY AIDING Final Report

T. B. SHERIDAN Mar. 1983 104 p refs

(Contract N00014-77-C-0256)

(AD-A129678) Avail: NTIS HC A06/MF A01 CSCL 05H

This report is about supervisory control, an increasingly prevalent form of man-machine system wherein a human operator controls a process as the supervisor of a computer. The computer, in turn, may perform limited automatic control or it may process and display information from sensors. The particular context of interest here is supervisory control of manipulators and vehicles for remote inspection and work in the deep ocean. After giving a more detailed definition of supervisory control and providing examples, the report reviews a number of experimental studies conducted recently at the MIT Man-Machine System Laboratory. These are divided into two groups. The first group of studies is concerned with computer mediation in command and control of manipulation. The next group of experimental studies examines computer mediation in processing sensed information and displaying it to the human supervisor. A brief conclusion reviews how these experiments fit together and speculates on problems and prospects for supervisory control in manipulation, vehicle and process control, and other areas.

GRA

N83-36687# University of Southern California, Marina del Rey. Information Sciences Inst.

THE CUE (CONSISTENT UNDERLYING ENVIRONMENT) PROJECT

T. KACZMAREK, W. MARK, and D. WILCZYNSKI May 1983 17 p refs

(Contract MDA903-81-C-0335)

(AD-A129696; ISI/RS-83-1) Avail: NTIS HC A02/MF A01 CSCL 09B

The goal of the CUE Project is to produce a system environment in which the data and functions of different interactive services can be combined to perform a single computation task. Construction of this environment will require research on data representation, program functionalization, user interface design, and selection of appropriate levels, for inter-machine communication. CUE is designed to take advantage of the knowledge-based system technology being developed in the Consul project. The CUE project will result in a running system demonstrating integrated services and exhibiting automatic interaction with the Consul system when required.

Author (GRA)

N83-36688# Naval Ship Research and Development Center, Bethesda, Md. Computation Mathematics/Logistics Dept.

SCIENTIFIC/ENGINEERING WORK STATIONS: A MARKET SURVEY Final Report

J. R. CARLBERG May 1983 94 p

(AD-A129394; DTNSRDC/CMLD-83/07) Avail: NTIS HC A05/MF A01 CSCL 05A

The David Taylor Naval Ship R&D Center (DTNSRDC), along with the white-collar segment of American business, is confronted with flat or declining productivity in the office, rising personnel costs, personnel ceilings and reductions, and a shortage of skilled workers, especially within the technical and scientific areas. Spurred by the development of powerful microprocessors and new software, designers of advanced intelligent workstations are developing a new class tool for technical personnel. These workstations are growing as tools to increase the productivity of scientists, engineers and managers. Five aspects go into making an efficient, productive workstation. These aspects are a flexible processor, general purpose and application oriented software, sophisticated graphics, local area network communications, and data base management. This report documents the results of a market survey to identify systems that can potentially meet the requirements for engineering workstations. Additionally, workstation application requirements for some of the Center's departments are discussed. System

requirements are discussed and are presented as a functional description.

Author (GRA)

N83-36689# Army Aeromedical Research Lab., Fort Rucker, Ala.

ATTENUATION VARIATION OBTAINED WITH SUBJECT FIT OF THE SIGMA ENGINEERING TRIPLE-FLANGE INSERT HEARING PROTECTIVE DEVICE

J. L. GOLDSTEIN Jun. 1983 24 p refs

(Contract DA PROJ. 3E1-62777-A-878)

(AD-A130676; USAARL-83-11) Avail: NTIS HC A02/MF A01 CSCL 06Q

The sound attenuation provided by a preformed-flange insert hearing protective device was determined when the user had no fitting instructions or training in the use of the device. This situation does occur in many instances among US Army personnel. The results of this study indicate that lack of training in the use of the Sigma Engineering Triple-Flange earplug reduces the available sound attenuation provided by the earplug by approximately 5 dB at most frequencies. Furthermore, the attenuation was more variable than that found in the experimenter fit group of subjects tested. Adequate fitting instructions should be developed and issued with the hearing protectors. Users should be trained in the use of the device.

Author (GRA)

N83-36690# International Trade Administration, Washington, D.C.

HIGH TECHNOLOGY INDUSTRIES: PROFILES AND OUTLOOKS. THE ROBOTICS INDUSTRY

1983 53 p refs

(PB83-211144) Avail: NTIS HC A04/MF A01; also available in set of 4 reports HC E99 as PB83-211128 CSCL 05C

This study is designed to (1) assess the international competitive position of the U.S. Robotics Industry; (2) pinpoint the major foreign and domestic challenges to American robot producers; and (3) suggest possible options for USG policies affecting the sector's international standing.

GRA

N83-36691# Fitzpatrick Engineering, Warsaw, Ind.

COMPREHENSIVE DOCUMENTATION OF DRIVER (DRACR) (DRIVER AIR CUSHION - ROTATION) AND PASSENGER (PAC) (PASSENGER AIR CUSHION) COMPUTER MODELS, REVISION A Final Report

M. U. FITZPATRICK 7 Aug. 1982 139 p refs

(Contract DTNH22-81-C-07550)

(PB83-207035; DOT-HS-806-311-REV-A) Avail: NTIS HC A07/MF A01 CSCL 13F

This manual is written to give the user of the DRACR computer model the specific information he will need to set up the input file, run the program, and interpret the results. This model describes the interaction between the driver of a vehicle and an air cushion restraint system. The air cushion is mounted to a steering wheel/steering column assembly which is modeled to stroke and rotate during the crash.

Author (GRA)

N83-36692# Fitzpatrick Engineering, Warsaw, Ind.

DOCUMENT THE PARAMETER SENSITIVITY STUDY: OUTLINE A SYSTEMS ANALYSIS APPROACH AND PERFORM A SENSITIVITY STUDY OF THE PASSENGER AIR CUSHION (PAC) COMPUTER MODEL Final Report, Sept. 1981 - Sep. 1982

M. U. FITZPATRICK 26 Aug. 1982 187 p

(Contract DTNH22-81-C-07550)

(PB83-207290; DOT-HS-806292) Avail: NTIS HC A09/MF A01 CSCL 13L

This report investigates the design and crash environment factors which influence the degree of protective capability offered by an inflatable restraint system to a three year old, forward positioned child. Two separate restraint system designs are investigated - a Chevrolet Citation system designed by MCR Technology and a DeLorean system designed by Fitzpatrick Engineering. The method of investigation is by using the PAC computer model in which various design and crash factors are separately simulated on the computer. The main objective of this

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study is to ascertain which of these factors influence injury most strongly so that the designer can design systems which minimize injury to the forward positioned child as well as the normally seated adult.

Author (GRA)

55

PLANETARY BIOLOGY

Includes exobiology; and extraterrestrial life.

A83-48054#

PREBIOTIC EVOLUTION ON A UNIVERSAL SCALE. I [L'EVOLUTION PREBIOTIQUE AL'ECHELLE UNIVERSELLE. I]

J. DUCHESNE (Liege, Universite, Liege, Belgium) Academie Royale de Belgique, Classe des Sciences, Bulletin (ISSN 0001-4141), vol. 68, no. 11, 1982, p. 781-820. In French. refs

The existence, character, and possible interactions of various organic molecules (precursors to prebiotic molecules) in interstellar space, on the planets, and on planetary satellites are discussed. The chemical forms underlying life are ubiquitous in the universe, although no currently known process converts nonliving materials to living cells. The history of conceptual advances that led to contemplation of the evolution of life in the universe is traced. Attention is given to molecular evolution on earth and the appearance and characteristics of amino acids, purines and pyrimidines, polypeptides, nucleosides and nucleotides, monosaccharides, polynucleotides, porphyrines, hydrocarbons, and fatty acids. The origin of the optical activity of biomolecules in interstellar space is considered, together with the processes of precellular organization. Note is taken of the radio resistance of nucleic acids, and the significance of the feature for bases, nucleosides, nucleotides, and aminomalonodinitrile (ADN).

M.S.K.

A83-49621* California Univ., La Jolla.

PREBIOTIC SYNTHESIS IN ATMOSPHERES CONTAINING CH₄, CO, AND CO₂. I - AMINO ACIDS

G. SCHLESINGER and S. L. MILLER (California, University, La Jolla, CA) Journal of Molecular Evolution (ISSN 0022-2844), vol. 19, Sept. 1983, p. 376-390. refs
(Contract NAGW-20)

The prebiotic synthesis of amino acids, HCN, H₂CO, and NH₃ using a spark discharge on various simulated primitive earth atmospheres at 25 C is investigated. Various mixtures of CH₄, CO, CO₂, N₂, NH₃, H₂O, and H₂ were utilized in different experiments. The yields of amino acids (1.2-4.7 percent based on the carbon) are found to be approximately independent of the H₂/CH₄ ratio and the presence of NH₃, and a wide variety of amino acids are obtained. Glycine is found to be almost the only amino acid produced from CO and CO₂ model atmospheres, with the maximum yield being about the same for the three carbon sources at high H₂/carbon ratios, whereas CH₄ is superior at low H₂/carbon ratios. In addition, it is found that the directly synthesized NH₃ together with the NH₃ obtained from the hydrolysis of HCN, nitriles, and urea could have been a major source of ammonia in the atmosphere and oceans of the primitive earth. It is determined that prebiotic syntheses from HCN and H₂CO to give products such as purines and sugars and some amino acids could have occurred in primitive atmospheres containing CO and CO₂ provided the H₂/CO and H₂/CO₂ ratios were greater than about 1.0.

N.B.

N83-36653# Joint Publications Research Service, Arlington, Va. OPTIMIZATION OF DEVELOPMENT OF HOUSEFLY LARVAE FOR UTILIZATION OF ORGANIC WASTE IN BIOLOGICAL LIFE-SUPPORT SYSTEMS FOR MAN

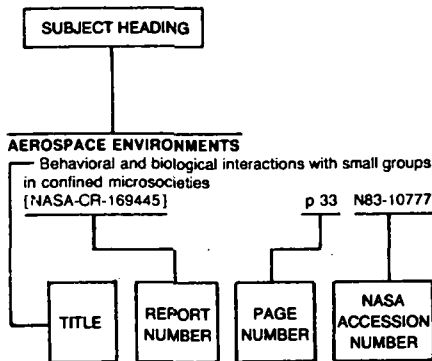
V. V. NOSOV and Y. G. GOLUBEVA In its USSR Rept.: Space Biol. and Aerospace Med., Vol. 17, No. 4, Jul. - Aug. 1983 (JPRS-84412) p 100-106 27 Sep. 1983 refs Transl. into ENGLISH from Kosmich. Biol. i Aviakosmich. Med. (Moscow), v. 17, no. 4, Jul. - Aug. 1983 p 68-71

Avail: NTIS HC A08

The development of *Musca domestica* L. larvae as utilizers of organic wastes in the biological life support system was investigated by methods of mathematical planning. The optimization of the process is based on the reduction to the canonical form of regression models set by second order polynomials. This approach was determining optimal conditions for larval development and substrate utilization with respect to 5 factors. On the basis of optimization results the following parameters were selected to ensure effective utilization of the substrate by larvae: the amount of substrate--150 g, its height--2.0 cm, temperature--34-35 deg, humidity--77%, larval density--10 larvae per g wet substrate.

Author

Typical Subject Index Listing



The subject heading is a key to the subject content of the document. The title is used to provide a description of the subject matter. When the title is insufficiently descriptive of the document content, the title extension is added, separated from the title by three hyphens. The (NASA or AIAA) accession number and the page number are included in each entry to assist the user in locating the abstract in the abstract section. If applicable, a report number is also included as an aid in identifying the document. Under any one subject heading, the accession numbers are arranged in sequence with the AIAA accession numbers appearing first.

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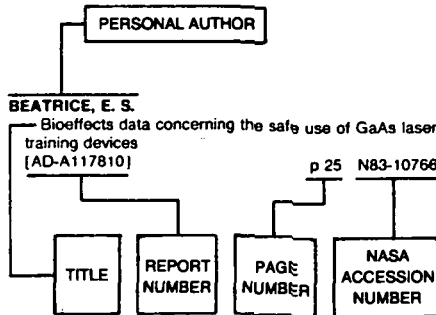
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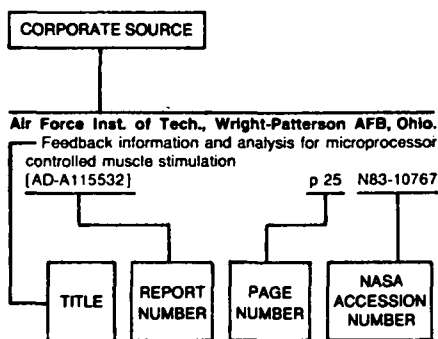
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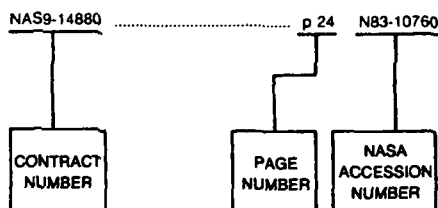
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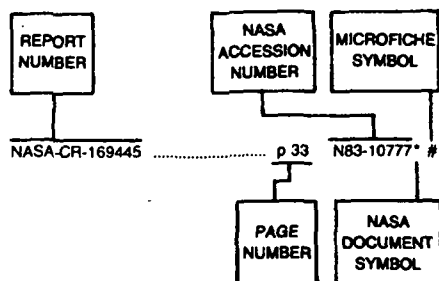
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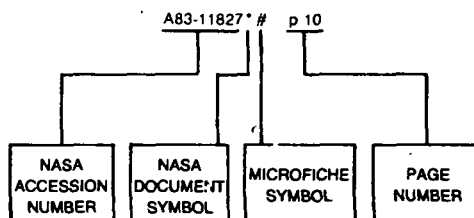
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